Concrete

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How Good Stucco Helps the Block Manufacturer

The Producer of Concrete Building Units Will Find That the Growing Use of Good Portland Cement Stucco Will Greatly Increase His Markets—The Use of Blocks as a Base for Stucco Must be Pushed by the Products Manufacturer

Concrete block and tile for the most part have failed to be chosen by the architect for wall construction where appearance has been a prevailing factor, because the block themselves do not meet the requirements of the average man when it comes to good looks. The old rock-faced block had a great deal to do in the past with relegating the concrete unit to use in unimportant surfaces, in foundations, as backing for other masonry units, and for use as a base for stucco.

Instead of bewailing this situation and merely trying to build *more* foundations and minor structures, the wise products manufacturer will take advantage of the situation and open up for himself a market that promises to be of the greatest importance.

The use of stucco has been limited in the past to the cheapest and often the least important houses since a good portland cement stucco did not possess the color advantages of other types of material. For the past few years, however, a new color technique has been available, and lately the knowledge of the use of permanent and pleasing colors, in combination with worthwhile textures, has become the common property of thousands of real architects. The means of producing good work are already in the hands of the good plasterer. It is now possible to economically produce a portland cement stucco that will please the most fastidious and satisfy the strictest requirements for permanency and true economy. The well-to-do citizen, no matter where he lives, is now beginning to think in terms of stucco for his own home in place of the more expensive and less versatile materials formerly used for the building of his home. Thousands of these houses will be built this year alone, and they will be built in every city and in every state.

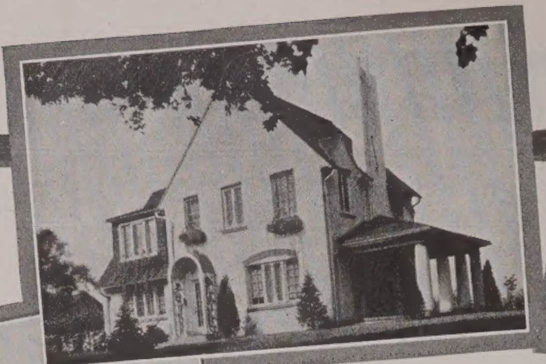
It is up to the progressive products manufacturer to get his share of the profits from the construction of these homes. Without his action most of them will be built of stucco or other materials than concrete blocks.

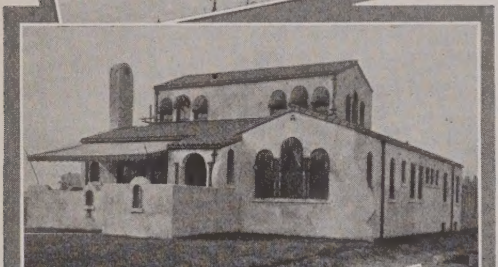
It is an admitted fact that there is no material better fitted as a base for good stucco than concrete units. They build up into a wall that is strong, sound, true, insulative, fireproof and permanent. They hold the stucco so well that it becomes a part of the very block themselves. And a concrete block wall may be run up by the average mason for a surprisingly low cost. The application of the stucco itself is an easy matter, for the suction is uniform and correct and the coats will actually require less material than on other backing. Where else can a real masonry house, covered with the modern everlasting stucco, be obtained for a cost as low?

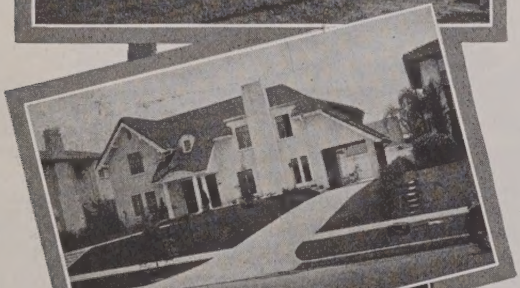
Here is a block and stucco house for Mr. Average Man. It looks like real value, and is real value, yet the cost is within the limits of his purse. A multitude of these houses, calling for a vast quantity of units, will be erected this year, next year, and in later years where the products producer is on the job

The products manufacturer who sees to it that the local builders and architects are sold on this type of construction and know how to design and erect these homes in the approved manner will be called upon to furnish a great quantity of units for their construction. He who takes it upon himself to see that his local building code gives this construction its full recognition, and who turns out a good block that he can fully guarantee and lets the public know that such is the case, will soon find it necessary to operate at a sufficient capacity to supply the far greater demand that will come in the periods of greatest activity. He will see his business grow by leaps and bounds and his profits multiply in like degree.

It is to a great degree the responsibility of the block manufacturer to bring about the firesafe age, which is but another way of saying "The Concrete Age."







Concrete Homes

HOMES of everlasting concrete — homes that satisfy human craving for beauty—are being constructed for the man of means. The wise executive does not hesitate to approve when his architect suggests permanent concrete construction, for his business instincts tell him that he will thus obtain full value for his investment, not only through permanency and low repair costs, but through ready resale value, fuel saving, protection against fire, true architectural merit, and all-around satisfaction. He is paying but little more than does his neighbor for good frame, yet he obtains a superior masonry construction that possesses every advantage—a house that permits him to forget painting bills, repairing of cracked plaster, hazards from exposure to fires, and the thousand-and-one other costly worries that beset the owner of the ordinary house.

These houses, in addition to being a really attractive improvement to the neighborhood, are built to survive not only for this generation but for others to come. They are built to live in—and not to sell. They set a worth-while example for the builder of smaller homes, for they are built for the nation's leaders.

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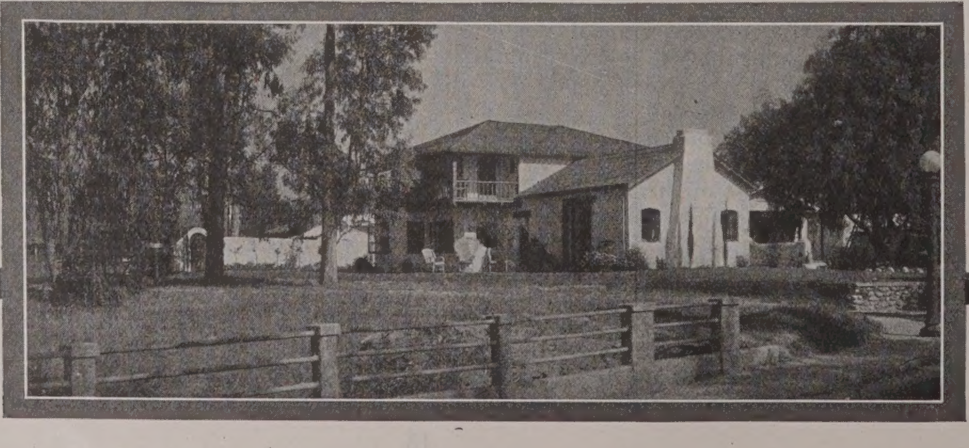
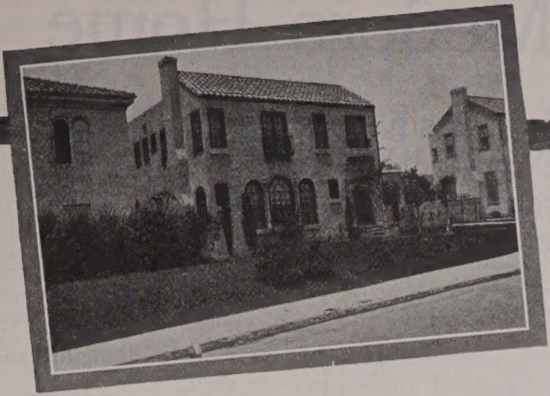
The concrete houses shown on these two

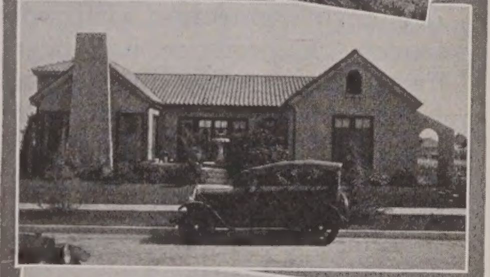


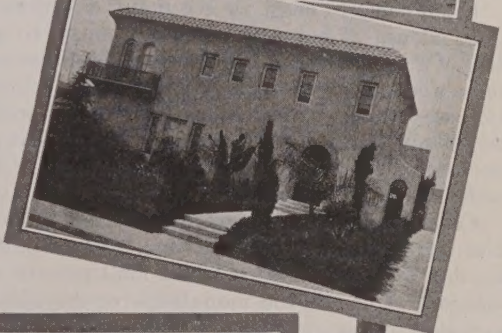


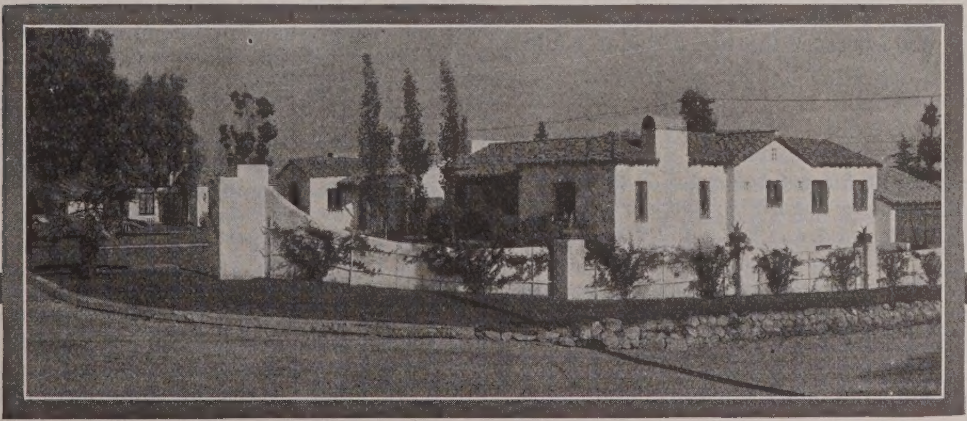
# of The Best

pages are for the most part built of precast units, and for the most part covered with everlasting portland cement stucco. The construction is sound, for the walls themselves do not shrink with age, nor do they work loose under their live loads as do frames of lumber. These solid walls, carried on foundations and footings of concrete—man made stone—resting on firm soil, will not shift and slide under any conditions. They were built by men who knew how. Since the structure is solid and unmoving there can be no cracking of stucco nor plaster, with its consequent ruination of decoration, and the houses—real homes—will remain looking new for years after shoddy buildings will have to be torn down to make way for sounder construction.

In houses like these it is frequently found a good idea to cover the roof with concrete tile and to make the floors themselves of fireproof concrete, overlaid in some cases with wood. These homes are built like the office buildings that their owners demand. Unit costs are low. From coast to coast, houses like these, covered with interesting stucco or with the blocks or monolithic walls exposed, are being built for the wise inventor and home-seeker.







Using Color on the Modern Home

The Architect and the Builder May Easily Use Color Effectively in Affording Modern Concrete Homes That Will Prove Readily Saleable at Increasing Prices—Points on Getting the Desired Color Effects That Will Be Permanent — Pigments to Use and How to Use Them

The architect and the builder, not to mention the home owner, are fast becoming awake to the possibilities of the use of colors on the exterior of the concrete house and there is now a great demand for information on the selection of pigments and the handling of them in connection with concrete and stucco. Experience has been gained by some, notably in California and Florida, where important strides have been taken in architectural practice in this respect. It is not a new movement, but rather a revival of half-forgotten practices of the Old World—with modern improvements.

It is for the benefit of those who wish to do meritorious work in this new technique that we here present data and ideas that have been assembled from every available source.

From coast to coast we see many examples today of an unusual use of color on concrete houses to gain popular Old World effects and to create an infinite series of new ones that might be called typically American. In addition we see the same color effect in connection with interior plastering, used to give a permanent and unusual decorative scheme that is far in advance of old-fashioned wallpaper or calsomine.

Colors obtained by pigmentation and by the use of special aggregates are used in concrete face-block that make up the wall, they are used in a multitude of effects in the stucco that covers the monolithic or the block wall, they are used in the concrete tile that cover the roofs, and they are used inside and out wherever the use of color could suggest itself.

Remember This

The cardinal principles of color are: *The use where and how in keeping with the architectural design of the house —the use in keeping with the landscape and surrounding structures—the use in accordance with the dictates of good taste—and the use of colors that will prove permanent under sun and rain.* If any of these main principles are disregarded, the result is unthinkable—a blot and an eyesore that will ruin the value of the entire neighborhood and cast disrepute upon the name of the architect and the builder. All the colors of the rainbow may be used—each in its own place—if proper care and forethought, and proper methods of application are used.

Color on exteriors goes hand in hand with periods of architecture, just as periods in architecture follow the dress and customs of definite periods in human history. The Spanish house runs to red roof tile, cream, buff, yellow or light pink walls, and other colors in tile, while the more subdued English cottage tends to show buff, grey, brown, or tan shades, as associated with light, leafy textures and half-timbered construction. Many other architectural styles are to be found—some being more popular than others in different sections, and each having its own range of possible color treatment in conjunction with texture of stucco and in general the treatment of the rest of the building.

The matters of construction and of stucco texture have already been discussed in former issues, and certain fundamentals of color question have been touched upon as well.

The aim of the architect is to plan the idea of the way the house is to look and to provide the necessary directions in order that the builder may do his part in translating the architect's idea into an actual building. The architect plans the effects, to suit the owner or the possible buyer, but it is the builder and his craftsmen who actually obtain the effects desired, and apply them to a sound and substantial structure, which in turn the owner translates into a home.

The architect and the builder use three elements to obtain the required effects: form, texture and color. Labor, applied to materials, according to predetermined methods, completes the work. If the plan be not right, no labor nor materials can make it right. If the materials be not right, the form is of no importance. If the labor be not skilled, the best plan and the best material will not assure the desired results. All parts must be joined to the common end, that the community may be assured a worthwhile improvement and the owner a building in which and around which he may build his home.

The matter of color is an affair that deserves the best thought of the architect, the engineer, the builder, the craftsman and the material manufacturer. Pigments that will not change shade or hue must be used in such a way as to give a pleasing effect and so as not to be marred by defects in the base on which they are applied. Light shades require the use of white cement and lightly colored aggregates. If colored aggregates are to be relied upon to aid the color effect they must be correct in hue and chroma, and therefore must be carefully chosen.

The Best Pigments

The architect, in answering the call for more color on the exterior of the American home, has turned to the use of that desirable plastic medium—stucco—as a material with which to work, since it not only carries quite naturally an infinite series of color possibilities, but gives him an unusual opportunity for three-dimensional form and a convenient medium to carry the color. When it came to the actual use of the color, however, certain difficulties were encountered, and it was not until the solution of these problems was found that the architect felt quite free in making wide use of the idea.

The matter of structural design, of course, was easily settled upon, and it is now known that a well-built house of concrete masonry units makes an ideal permanent and economical structure on which to place portland cement stucco. Then, too, it is common knowledge that certain frame construction, together with wire mesh or expanded metal as a reinforcing, properly furred, is quite adequate to take the same stucco.

Old mortar colors, in many instances, though, were not found to be of sufficient permanence to justify their use. The sun's rays soon faded the colors, and the lime of the cement itself decomposed them into other colors and shades or into no color at all. Excessive amounts of pigments of low tinting value weakened the stucco and caused its failure. Painted stucco did not stay colored very long. The old oil base stains blistered and rubbed off. Investigation, however, at last showed that limited amounts of metallic-oxide pigments, finely ground for high tinting value, and intimately mixed and ground with exactly proportioned amounts of cement before being mixed into the stucco itself, would afford absolute permanence and be proof against the fading formerly caused by the action of sunlight and by the lime in the cement stucco.

A wide range of these satisfactory colors are now obtainable from various color manufacturers. They may be mixed on the job, or pre-mixed and ready-sanded colored stuccos may be obtained from a number of manufacturers. For the sake of absolute uniformity, machine mixing or the use of the prepared stuccos is generally now specified by the architect.

Probably the best colors now available, and current researches should cast further light on the question, are as listed below. Other colors and shades are easily obtained by mixing the standard pigments listed.

Reds and Pinks	Red Oxide of Iron
Yellows and Buffs	Yellow Oxide of Iron
Greens	Chromium Oxide
Browns	Brown Oxide of Iron, Burnt Umber
Blues	Ultramarine Blue, Prussian Blue
Greys or Slates	Manganese Black, Drop Black, or Germantown Lampblack

In using any color not more than 10 per cent of the weight of cement should be used, or 9 pounds per sack of cement, as greater quantities may weaken the stucco. The better grade of colors, having a high tinting value, are such that much smaller proportions are sufficient to give the usual shades. Because of this higher tinting value it is usually good economy to buy the more expensive colors, for a little will go a long way. There is no standard formula for proportioning for any given shade, but the proportions must necessarily be determined in each case by experiment. Exact proportions will depend upon the colors themselves, upon the cement, and upon the aggregates. The best method of determination is to make up a series of test pieces, each with a measured amount of color and all having the same proportions of sand, cement and water. Careful weighing is necessary in making these determinations, and the exact proportions decided upon must be adhered to in the actual work.

These same principles are just as important in the making of colored concrete tile, concrete block, concrete brick, concrete pavements, and in any other work, for the technique of the use of color in all concrete is the same as in stucco.

In securing color effects with portland cement stucco it is first necessary to be certain that the entire area to be covered has the correct suction and that the suction is uniform at all points. Then the colors must be ground or machine-mixed with the cement, in a dry condition, until even pigmentation is secured. The colored cement is then dry-mixed with the sand, in a standard mixer, until this material in turn has an even distribution of cement and color. Not until then may the water be added and the ordinary mixing be accomplished. All this takes time, but is necessary to insure a good job when factory-mixed stucco is not utilized. Color and cement, color and lime, or color and cement and lime are best combined by grinding them together in a ball or pebble mill. Small mills of a type suitable for job use are available for this purpose. The next best thing is to mix them in an ordinary concrete mixer. In order that an intimate mixture of cement and color may be effected, it is necessary that the pigments be at least as fine as the cement. The cheaper colors do not ordinarily fulfill this requirement, it is said.

In applying the colored stucco as a finish coat, it is possible to adhere entirely to established good plastering practice. The plasterer, using the tools of his trade, applies the desired texture, and applying the colors according to the design. A single color is an easy matter to handle, as the use of one-colored stucco is handled the same as uncolored stucco.

When it comes to obtaining polychrome effects in connection with certain textures several different methods may be used. An amount of each of the colored stuccos may be placed separately upon the mortar board, and smaller amounts from each pile are laid together on the hawk, the trowel then being used to cut through and apply this varicolored mortar on the wall. Another method calls for the blending of the colors by combining the desired amounts of colored mortars on the mortar board, and then proceeding as usual with the hawk and trowel in applying the stucco onto the wall. Still other interesting effects may be obtained by a good plasterer when alternate dabs of each color are trowelled separately onto the wall in a predetermined manner, and then the colors blended by a few strokes of the trowel, hitting only the projecting portions of the fresh stucco.

Still other effects may be secured by first running on a base coat in one color, with only approximately the desired texture, and then running on ridges or fins of the second and even third colors, and then blending to some extent by means of the trowel, broom, sponge, or other tool. An additional color is easily applied as a wash, and then lightly rubbed off the high spots before it has a chance to dry. This wash is made up of equal parts of color and cement, with enough water to give it the consistency of cream, and it is applied with a calsomine brush.

Special paints, sold under trade names by prominent manufacturers and ready to use, are available for this purpose. The spray gun may often be profitably used in applying a stain of this kind, although special nozzles and hand-agitating tanks are required when this equipment is used. Special designs, according to the taste of the owner, may be executed in polychrome with the aid of this type of stain, a set of stencils, and paint brushes.

As to the use of color in the manufacture of concrete units, as said before, the rules are pretty much the same. Still other effects, however, are often possible, especially with roof and floor tile.

In the manufacture of concrete roofing tile it has often been the custom in the past to put the color only on the

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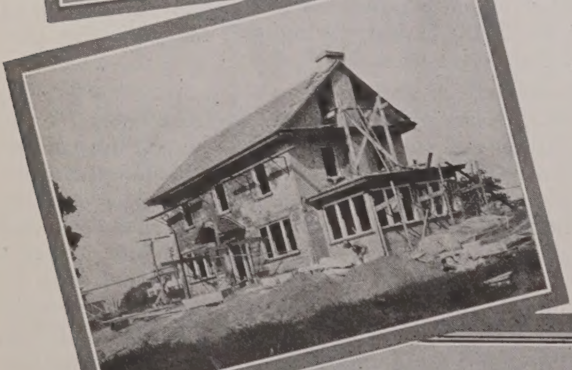
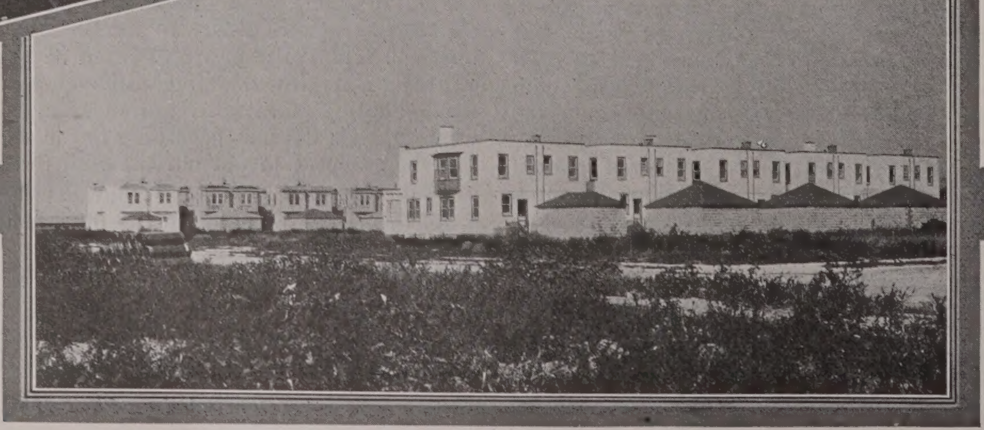


Concrete Houses Small

WHEN Mr. Average Man wants to build a home for his small but growing family he wants to, and must, obtain a dollar's worth of construction for every dollar he spends. He has no money to waste—and in fact his entire life's savings are required to finance the needed home. He must either deliver himself into the hands of the shoddy builder for the sake of easy terms—which is unsound and unwise—or he must build a home of lumber that will cost him more in the end than he may be able to afford, must build himself a smaller home of masonry, which will not really meet his requirements, or take the best step of all—build the house that he wants and build it of concrete. The latter is the better step of them all for it affords him a home that is big enough, that can be built at a low unit cost, and that has all the virtue of the permanent home being built for his fellow citizen who has more money to spend.

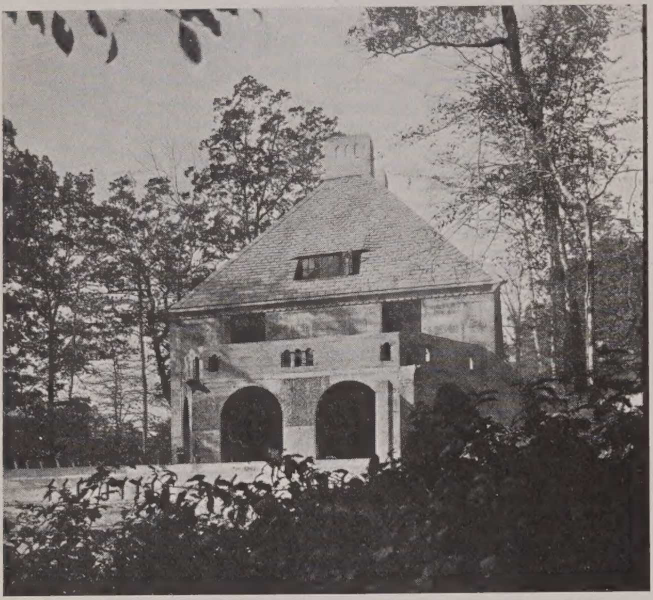


# of Worth for the Family

On these pages are a number of homes of everlasting concrete that have been built for the man whose income ranges all the way from $5,000 a year to half that amount. They were built at prices that were unusually reasonable, and in line with moderate earning capacities, and yet they look like still greater value. The first cost of these houses is almost the last cost, for repairs and decoration are minimized. Simplicity is the rule, yet architectural merit is for the most part manifest. Simplicity has held costs to reasonable levels, yet construction is of the best. Good portland cement stucco, applied over frame or concrete masonry, affords permanent and attractive exteriors that will last as long as the structure. At the bottom of the page are two industrial developments—dwellings erected by the row and intended for purchase by the working man. One is more simple than the other, yet the better architectural treatment of the one has not run the cost much over that of the other.

The House of John I. Bright, Architect

When This Architect Built Himself a House He Made It All of Concrete, Used Form Marks as Ornamentation, and Special Aggregates Gave the Color—Even the Inner Wall Surfaces, the Fireplaces, and the Kitchen Range Are of the Same Material



Concrete, unashamed—The John I. Bright house

John I. Bright, a Philadelphia architect, having built many houses of many kinds for his clients, built one for himself. It is of concrete. It is unusual in conception and in execution. It has a charming site at a road fork in Ardmore. The site may be said to be triangular in both plan and elevation—an abrupt little hill, covered with fine trees, the house among them.

And because of this setting, the exterior finish of the house, which for the most part is as it came from the forms, does not obtrude its honest plank marks. The interior is just as honest—concrete—brushed down, hammered, or rubbed, decked out here and there with tile, but nowhere covered up with plaster. Walls, floors, stairs, even the kitchen range, all of concrete.

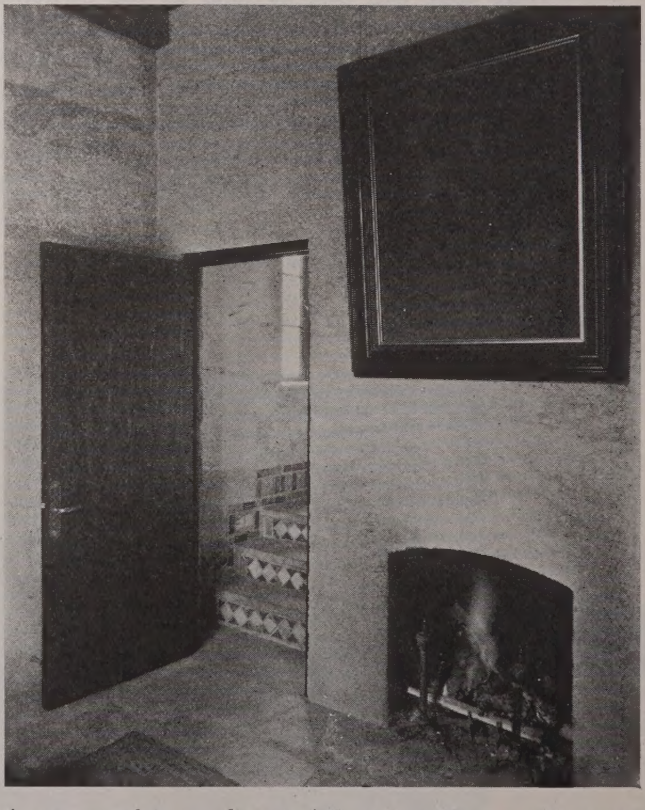
Mr. Bright started out on his own plans and specifications conventionally enough, trying to get, according to a popular view, "the most for his money." When he had got so far as the estimates it dawned on him that with the best economy and the best of luck, the job would still run into a lot of money, because it was to be considerable of a house. And as most of the materials and the methods of construction would be ordinary and conventional, too, the bigger the job, the more the upkeep and the repairs. So the ordinary materials seemed to Mr. Bright to represent a poor kind of economy. He began all over again; he would build it of concrete. He had faith in the material, not only in its permanence and structural integrity, but in the final qualities that were only occasionally brought out of it.

A great many people would not like Mr. Bright's home for two reasons—first because of the things which Mr. Bright now knows how to do a better way and second because of the things which Mr. Bright would do the same way, if he did them again.

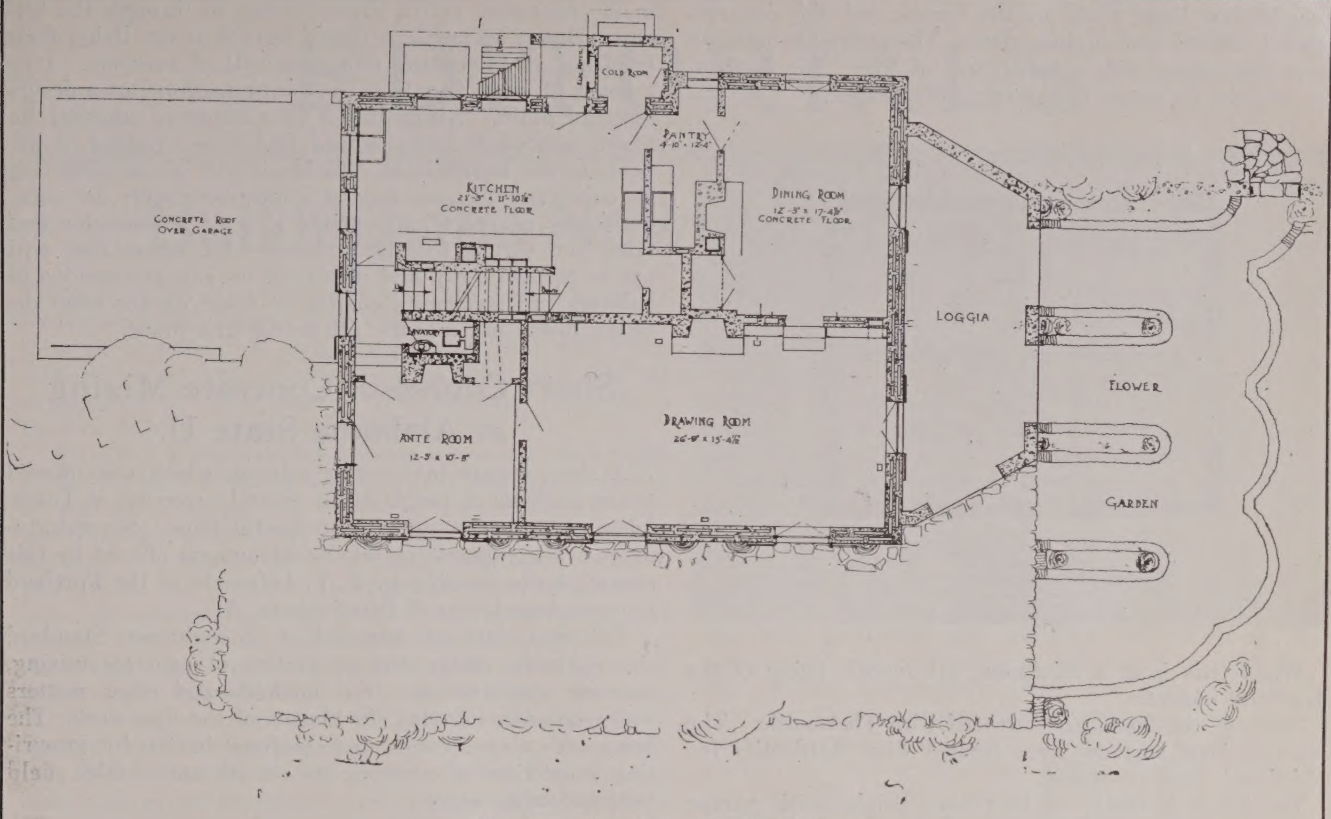
He wanted a concrete house. He didn't want it to appear to be anything other than a concrete house. Board marks from the forms seem to him to be a proper element of the surface of a concrete wall, which he chose to have rugged, but which he frankly confesses is rather more rugged than better practiced workmen would have made it. Still he prefers the result to stucco—to anything laid on over the structure.

The walls are 15 inches thick and insulation is provided by a double series of vertical air spaces, made by collapsible cores which were pulled up as horizontal form sections were added. These air spaces are 2½ inches wide and 2 feet long, the two rows of spaces so staggered that Mr. Bright finds the insulation is satisfactory and no dampness has been apparent.

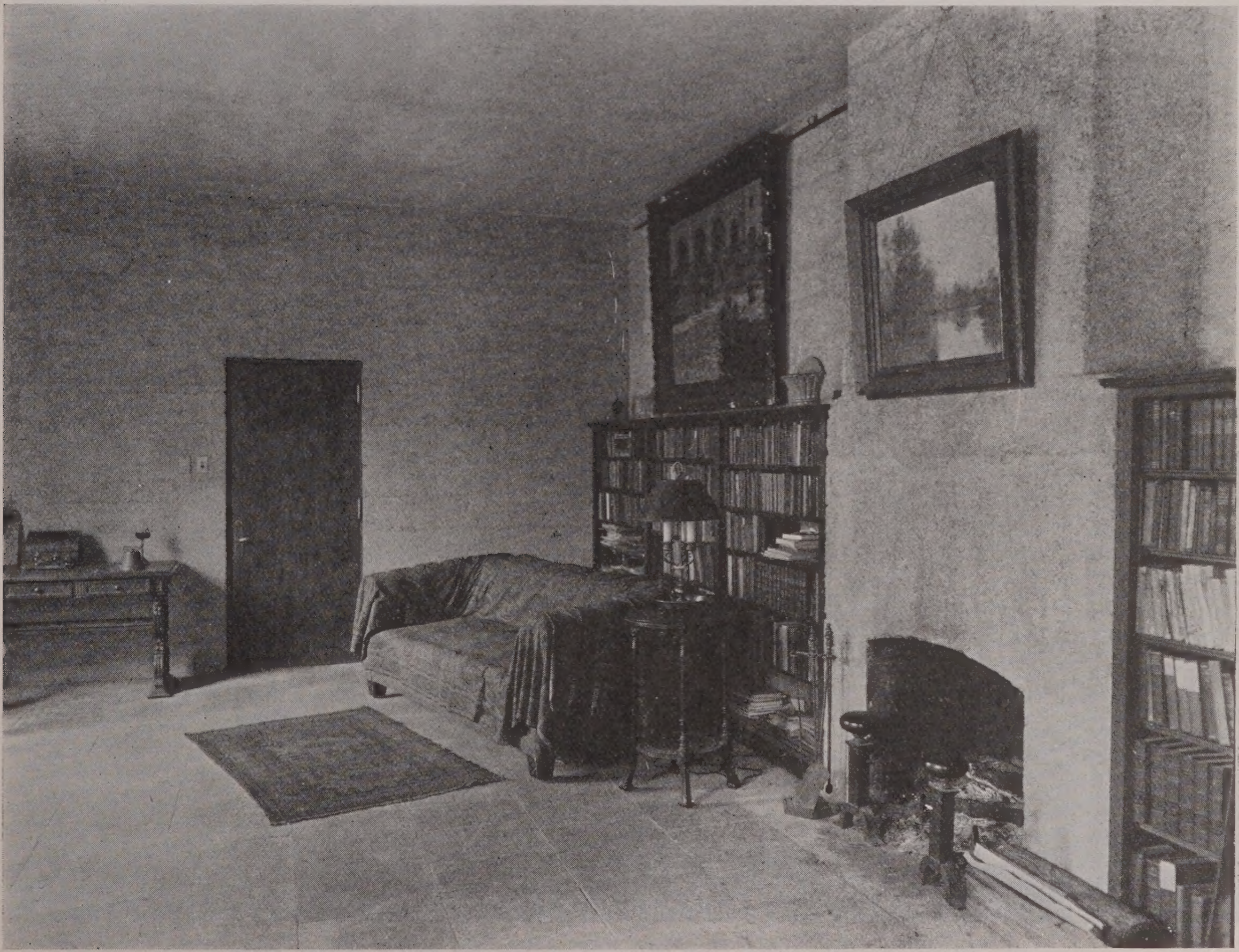
In three rooms, the more important ones, the concrete on the surface was made with a special marble chip aggregate. This was cleaned down with acid, giving warm tones of rose and yellow and an interesting texture. Considerable areas of wall are without other decorative treatment, while in restricted areas there has been a liberal use of Mercer tile in rich colors, most of this tile decora-



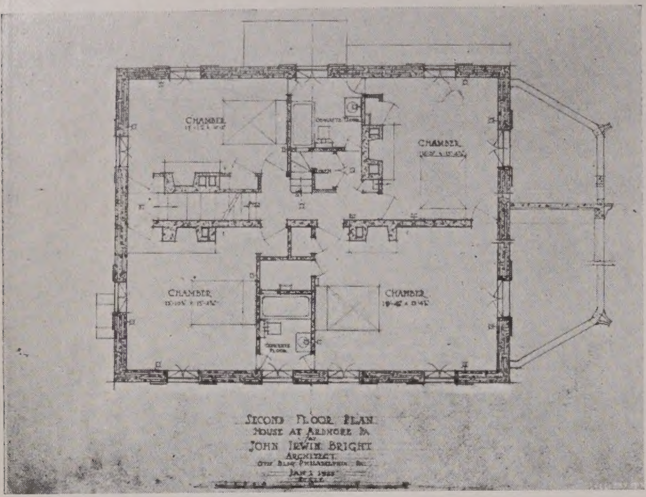
A corner—and just a glimpse of the stair, with its wealth of color in the tile inserts



First floor plan of the John Bright house



The living room, with the concrete fireplace and the form-marked walls tion having been glued to the forms and the concrete placed around and against them. The stairs are particularly interesting with a lavish use of tile. The kitchen, too, was by no means neglected in this respect.



Wood trim is at a minimum, all reveals being of the structural concrete.

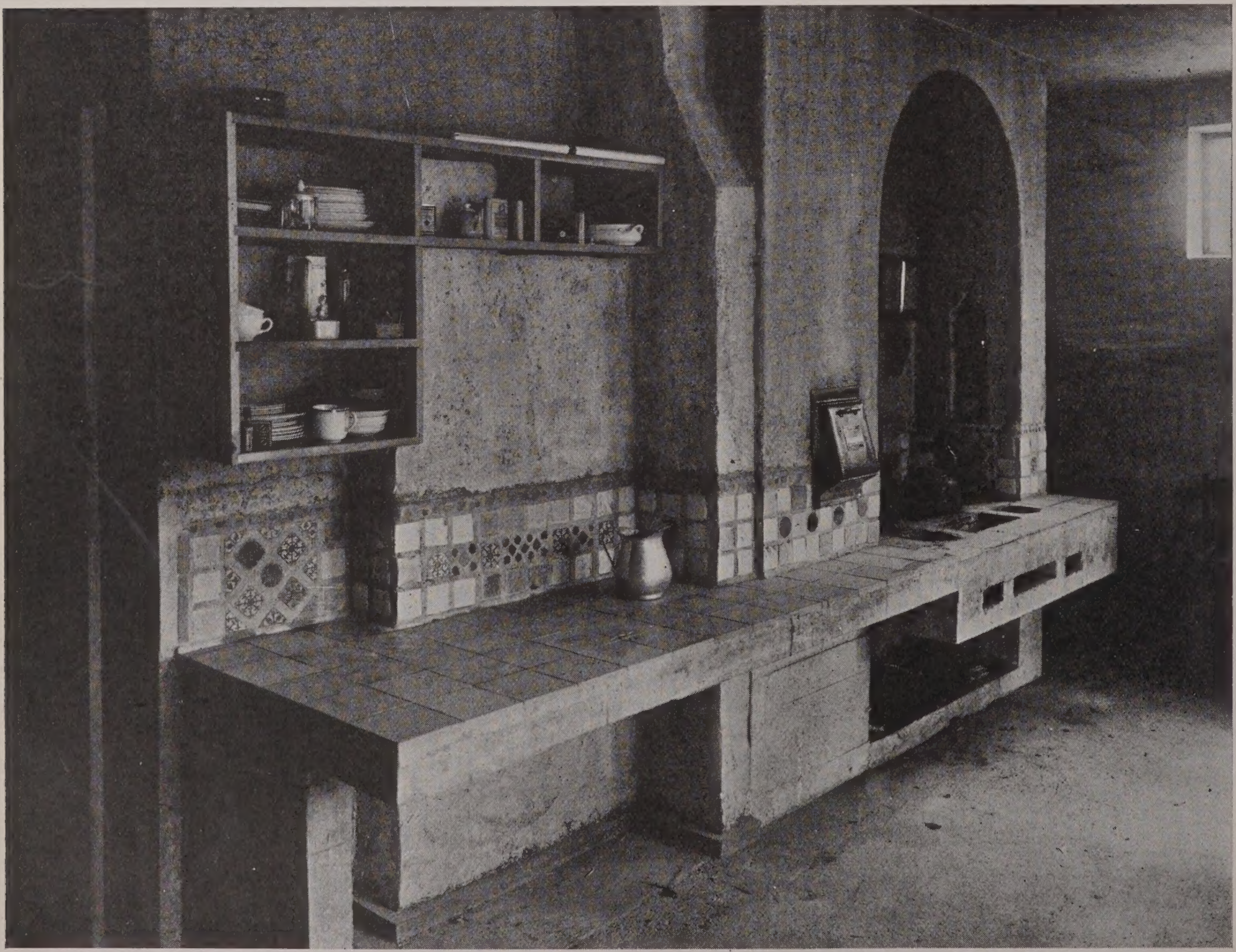
Some of the floors are surfaced with Thermotile. The concrete floor surfaces were treated with Hardentite for additional wear resistance.

The house is really of four-story height, with garage in the basement and a drive cutting in through the hill onto a lower terrace. A broad terrace at the living floor level has an interesting retaining wall of concrete. It is a house of many fireplaces, as the plans show, of a design severely plain. Altogether it is a house of unusual interest, and while many would find it too rugged, it appeals to the imagination. Inside it will go on gathering its color and its own special atmosphere with the accumulations of years and outside it is of a character that vines and shrubs will be at home with, where they will not be thrown down and disturbed by any processions of painters and mechanics coming to make up for what the owner didn't put into the job in the first place.

Short Course in Concrete Mixing at Alabama State U.

A short course in concrete mixing, which was offered to the students of the Alabama State University, at Tuscaloosa, Ala., has come to a successful close. Several students availed themselves of the advantages offered by this course, made possible by R. F. Leftwich, of the Portland Cement Association of Birmingham, Ala.

This first class was attended by 75 engineers. Standard test methods, design and properties of concrete mixing, concrete specifications, trial methods and other matters were considered during the classes of the first week. The last week's classes considered calorimetric tests for impurities, inspection of concrete, use of Abram's tables, field tests and other angles.



The kitchen—Concrete, built-in work table with tile top—and built-in charcoal range

EDITORIALS

Building the New American Home

We are witnessing the birth of a new industry, an industry whose importance is so vast that no man living can measure its extent. It is a new industry that will bring welfare to the people of the nation and profit for all engaged in it. We refer to that thriving youngster—modern concrete house construction.

We call it a new industry because it has cast aside many of the old ideas of home building. It is resulting in homes of real architectural and structural merit, founded upon new theories as well as on the past experiences of the builders of concrete office buildings, mansions, bridges, and streets, and of all the great structures on which problems of construction and design have been fairly well solved. The building industry is now reaching to the American home, to design it well and to build it for permanence, and to do it at a cost that is within the range of the average purse. American public, educational, industrial, and business building, when design and construction have been honestly taken care of, has been synonymous with permanence and firesafeness, while the American home has generally been sadly deficient in these respects, except in the homes of the wealthy. The mission of this new industry is to give the average citizen a home that is every bit as well designed and constructed as the building in which he earns his living, and yet to give him this construction at a cost that is not much greater than he is used to paying for his ordinary hazardous and commonplace house, built of less permanent materials, that are really more costly in the end.

The architect and the builder have been watching the development of other concrete construction, and have now applied their knowledge to the building of homes. True, details are not the same, nor are surface treatments of a similar nature. Essential principles are, however, sufficiently alike to give the same advantages and to render possible a low unit cost, a low repair cost, slow depreciation, greater resale value, adequate heat-saving, fire-safeness, and more all-around satisfaction.

The architectural possibilities of this construction are enormous, the range of variety infinite. A plastic medium, into which any imaginable color scheme may be worked, that forthwith hardens into solid stone in any shape that the builder desires, concrete is putting soundly built and attractive homes within the reach of a greater number of our people. The start has been made, but the whole industry will not broaden out into its proper magnitude until every unit of the industry takes its part in the general advance.

If the men now designing and building small homes do not see fit to enter this great movement, then the men who are now designing and erecting larger structures will take their place. The great economic waste caused by shoddy construction and by the higher cost of other good construction cannot continue when the honestly-built concrete house is available at a reasonable cost. Financial concerns realize the need and are finding it to their interest to insist on better construction before loaning money for house construction.

The enhancement and stabilization of property values is particularly important in the construction of houses for the man of lesser wealth, whose entire capital is usually tied up in his housing program.

Then, too, we are indeed fortunate in this great industry in that the great architectural possibilities of this type of construction make it an attractive field for the best of architects, and the fact that the material readily lends itself to the best of permanent construction and a sounder economic condition, attracts the best of builders and the most respectable of financial organizations.

What is probably the one thing that has caused an interesting increase in this type of construction is the fact that architects and builders are becoming better able to put colored and textured stucco to work on the job. Whole communities, built to a plan of color and form, are being constructed the new way. An interesting example is the development of a widely heralded winter playground, a new town near Miami, Florida. Then there are the many scattered examples of the finest work of the architect and the builder, ranging from the mansion of the wealthy to the home of the average man—houses that all possess the same unusual qualities and economies but differing in size and in the excellence of interior appointments. Indeed, the popularity of this type of construction bids fair to soon outgrow the ability of the industry itself to deliver the materials.

It is a hard fact that the block manufacturer, the stucco producer, the color manufacturer, the trowel trades, and the builder, will find it necessary to plan for greater production. They are now being forced by economic requirements to further the development of this industry, and as the industry grows, they will be forced by opportunity for profit to expand likewise.

We may be overbuilt, according to some authorities, on many types of construction, but as long as people continue to reproduce their kind, as long as population migrates from land to land, as long as the motor car continues to open up vast new tracts of residential property, and as long as the present stock of matchbox construction continues to be rapidly destroyed by fire, just so long will the building of the modern concrete house call for the expenditure of millions of dollars and the use of a vast amount of labor and materials every year.

The idea behind the growth of this great industry seems to stand out beyond all argument—that the people are demanding good homes that are permanent, well-insulated and reasonably priced. The concrete home is the answer to this great need—but that is not all. It is likewise the answer to our requirements for fire-safeness and for greater beauty. It is demanded by those who have the welfare of our communities at heart and by those whose very investments are imperiled by temporary and unattractive construction. Where there is need there is a market, and where there is a market there is profit. But beyond all this, where there is profit there lies the welfare of us all. Let us every one pledge ourselves to further the growth of this great infant industry and prepare to do our share in making its development possible.

Not a Stick of Wood Here

Steel and Stucco Make the Hul-lo-wen House a Modern and Fireproof Home—Steel Framing and Trim, Together with Insulated Stucco Walls, Fireproof Floors, and Built-in Steel Furniture Make Up This Unusual Construction

To make permanent, unburnable buildings, the Hul-lo-wen Fireproof Everlasting Homes Co. has begun work in Detroit. The first house, at 12725 Washburn Avenue, completed some months ago, was used for exhibition purposes and is now occupied by Alva M. Hull, president and architect of the company. A second much larger building enterprise is now in progress at Bloomfield Center, a 20-room suburban residence, for A. F. Stevens. A unit pressed steel framework is the basis of the system, which uses concrete liberally, together with steel window and door frames, windows and trim and built-in steel fixtures.

The company has no system or materials for sale, proposing to develop its own specifications through its own contracting organizations in various centers.

The company's building program is not rigid—it is flexible as to kind of house and the masonry material of the exterior finish and the amount of insulation built into the walls. Aside from the steel sections, the enterprise is based more on an assembly of materials and methods already tried, than a complete departure from the usual in the methods and materials of construction.

The system, if it may be called a system, is the work of Alva M. Hull, architect, and Elijah H. Owen, engineer, with whom Royal L. Smith is in field charge of construction.

Fig. 1 shows the first house, the home of Mr. Hull—nothing particularly unusual about it in its general aspects; the quality built in. Figs. 2 and 3 are typical interiors showing the effect of metal trim and built-in features of kitchen furnishing, all of steel. Figs. 4 and 5 get closer to the details in showing the big Bloomfield Center job in progress.

The basement walls are of concrete, supporting pressed steel floor joists over which rib lath and light rods provide centering and reinforcement for the 2-inch concrete slab floors. The floor finish is of magnesite composition with cork and asbestos filler. The upper floors, supported on the steel frame work, are of like construction. The walls

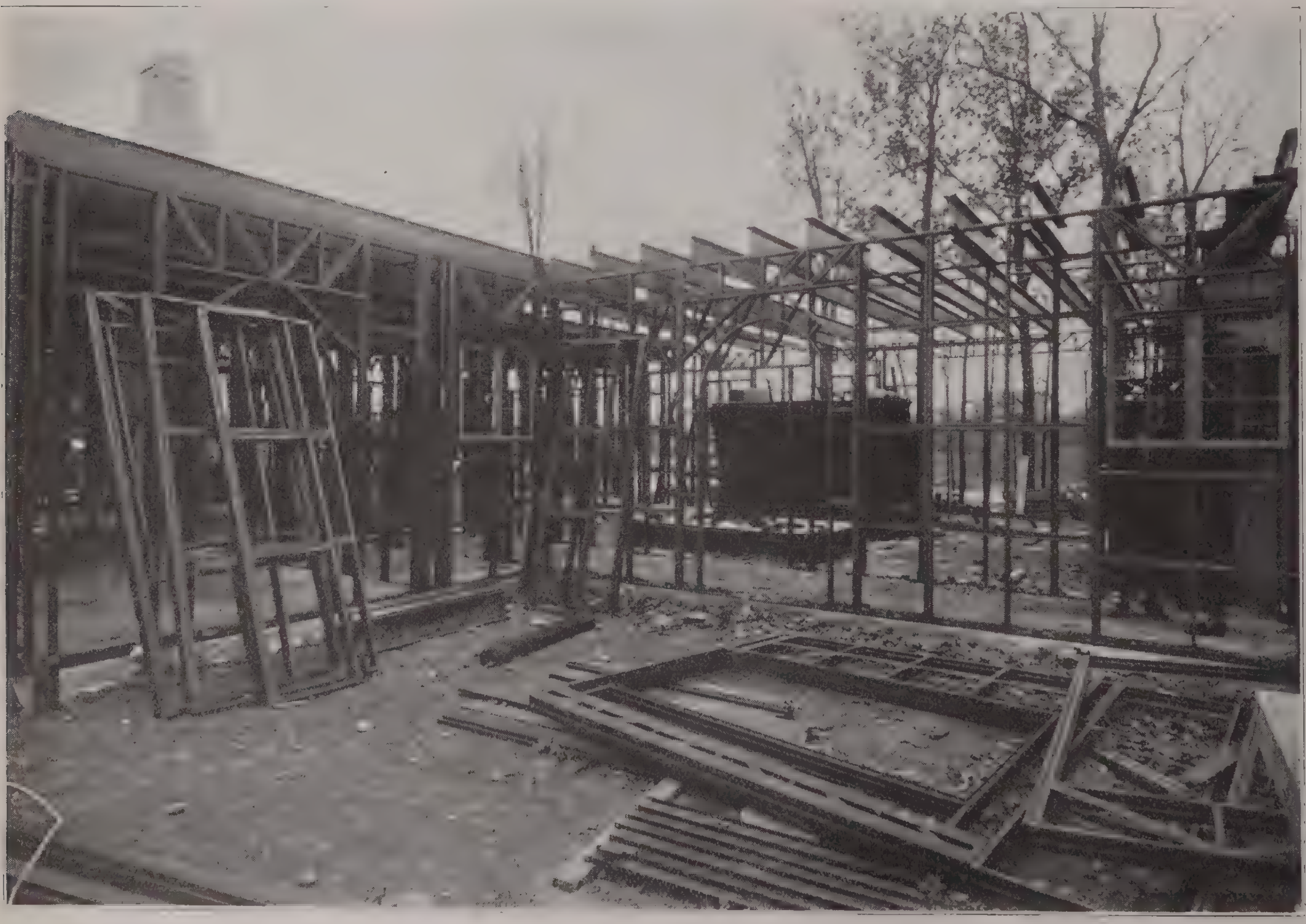


Fig. 4—Steel framing of 20-room residence, built like an office building

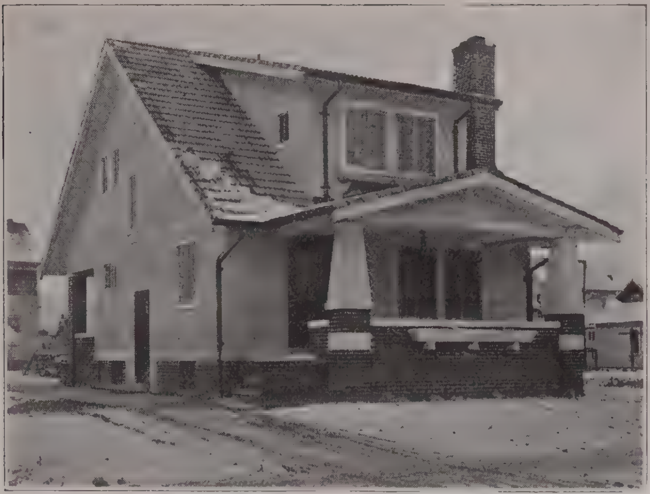


Fig. 1. Mr. Hull's residence, the first house to be built

are framed with unit steel sections about 2 feet wide, adjusted to walls in other than even multiples of 2 feet, by means of a loose stud member. The studs which form the sides of the sections are of two pressed steel channels, given additional stiffening by having a semi-circular rib rolled into the center of the channel. Two of these channels, back to back, form a stud and the two studs of a typical section are bridged by five cross members. Sections are quickly set up. Prongs built into the studs are bent over to clip down the Celotex linings and metal lath on which all plaster is placed.

The exteriors will be variable to suit the owner—stucco, brick or stone. Stucco, anticipated as the usual finish, will be Portland cement, three coat work, applied on self-centering metal lath against Celotex, color being introduced integrally in the finish coat.

The roof will also be framed with pressed steel sections and covered with concrete roof tile.

The literature of the company places a good deal of emphasis, first on fire-safety, on insulation, on the wearing quality of the wood-grained finish of the steel trim and built-in accessories, on the freedom from upkeep and damage from cracked plaster, and on the general quality of workmanship, coming as it all does under the control of the promoters of the construction. So far as structural costs are concerned, they are said to be no more than ordinary masonry wall and interior wood frame construction, where the element of fire risk is great from the nature of the interior hazards. It is said as a note of interest in connection with the very large suburban house for Mr. Stevens that he had planned to use a type of construction where he would have been under constant risk from fire, to guard against which he was going to spend a considerable sum for a tank and a special water system. He became interested in the Hul-lo-wen type of construction and it is said that the money the owner would have spent for his special fire protection, which he eliminated from the job, will pay the additional cost of the more permanent and repair-free job.

Proof that lien laws now in force and existing surety bond conditions have played leading parts in causing large losses to the building public during recent years has been developed by a study conducted under the auspices of the Associated General Contractors of America.

Unethical practices, diversity of contract stipulations and speculative building are among the other subjects given direct attention during the past year.

These as well as other related subjects, were discussed at the recent Portland, Ore., meeting of the association.

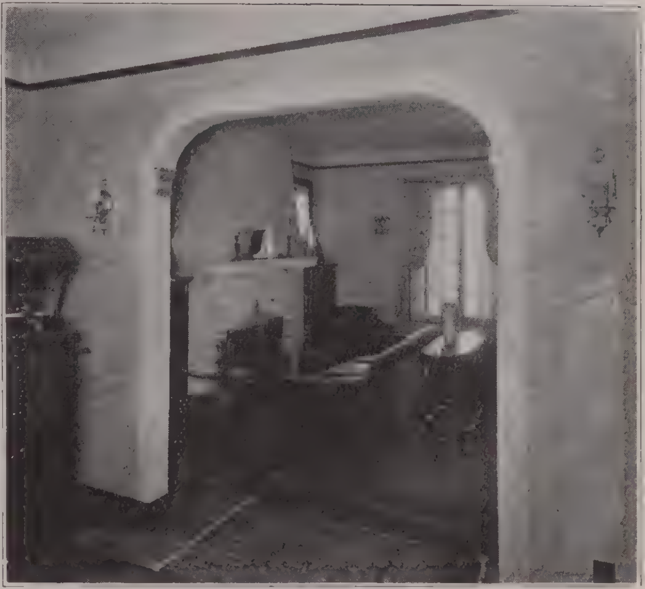


Fig. 2—A typical interior, with the steel trim

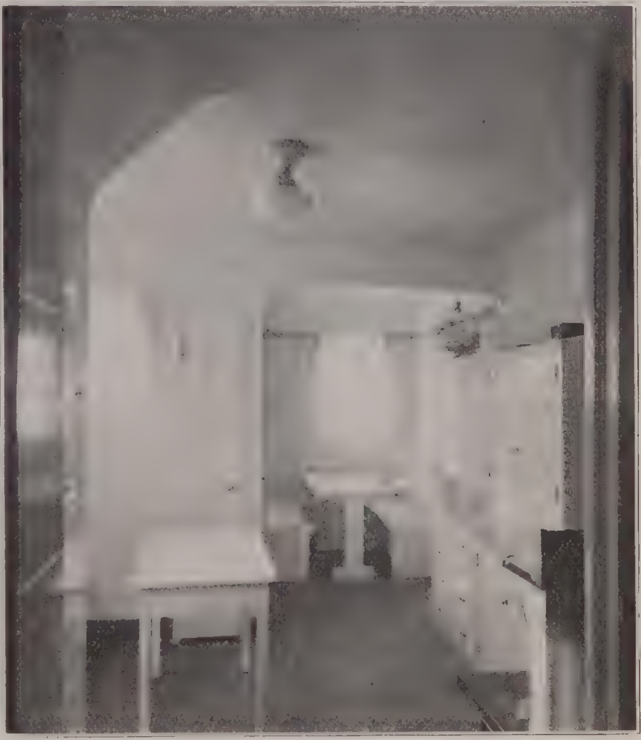


Fig. 3—The built-in steel furniture in the modern kitchen

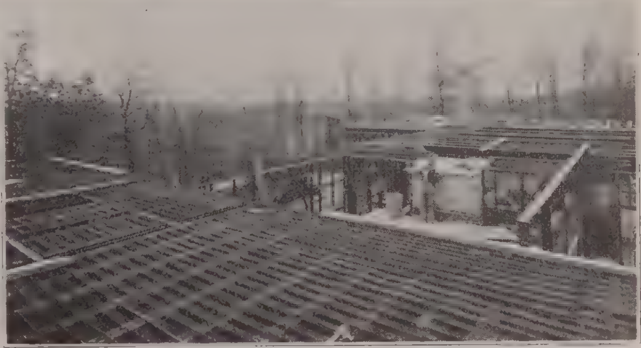


Fig. 5—Floor construction, with expanded metal in place

Miss Gleason Is Building Little Concrete Frame and Stucco Houses in California

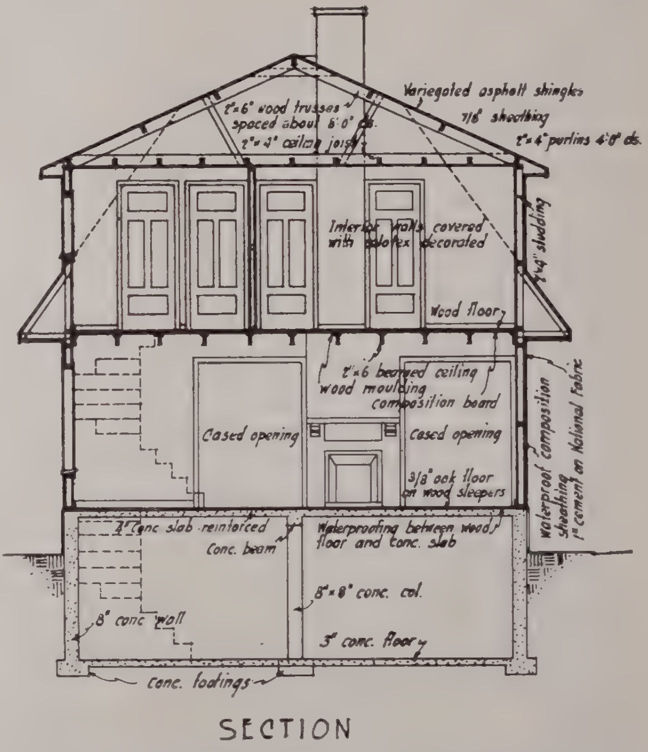
The work of Miss Kate Gleason, engineer, East Rochester, N. Y., is never uninteresting, even though you might now wish she would use more concrete and less lumber. Those of CONCRETE's readers who have been following the magazine's reports of house building work for several years will remember that she first attracted attention in this magazine's sphere of activity in building a rather large group of interesting little concrete houses—about a hundred of them—in East Rochester.

She built up a complete concrete house-building organization and transformed a crescent-shaped side hill into a little village. While these houses—poured concrete they were, with reinforced concrete floors and stairs—were small they were so cleverly scaled down in all their dimensions that they were attractive and they did what she planned them for—took the young couples and the very small families out of the two by four tucked-up apartments—all at a hundred dollars or so down and $40 a month on a purchase price of about $4,500. The kitchens were so small that Miss Gleason equipped them complete (even to a mirror and powder puff, which she said every kitchen should have) because she anticipated prospective buyers and renters would say they were too small for necessary kitchen equipment. The floors in these houses were finished to live right on the concrete—except, of course, for rugs—the concrete being stained brown and waxed. After a year's wear they were very attractive. This work required a topnotch finisher and she had one then. Readers will also remember that Miss Gleason was the first woman graduate in mechanical engineering at Cornell (when her father needed her help in the big Gleason works) and that she is the only woman member of the American Concrete Institute. She addressed the convention of that organization in 1922 and told how she did not follow tradition in her house-building work, starting her planning with the necessities and some of the little luxuries of living instead of with plans and specifications as they have come to be under men's dictation and the restrictive influences of tradition.

Her California Work

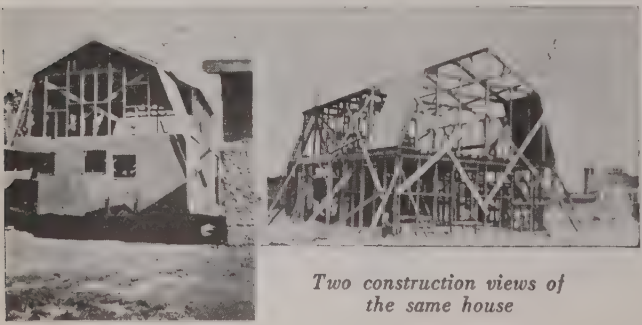
Now Miss Gleason is in California building houses—lighter and lighter in weight, still pigeon-holing tradition and beating out her own path, as she thinks it should go. Let some excerpts from Miss Gleason's letter (January 18, 1926) and her own drawings tell their own story, for Miss Gleason has her own way not only of doing the thing but telling it. Miss Gleason writes:

"The drawings show the 1926 model. The basement is poured concrete to. withstand earthquakes and fires. I show the wall 8″ to conform to standard building laws. But I think a 6″ wall of well mixed concrete is ample for this size house. The outside measurement of foundation is 24′ by 20′11″ so as to project 1″ beyond the frame. The 20′11″ dimension is the important one. It allows a span of only 9′6″ and that short span makes the cost of reinforcement very small. The only kick I had on the basement is that I had to put the laundry in it. (Miss Gleason has heretofore expressed her ideas about putting women into the basement to do the washing.) But perhaps a basement laundry is not so objectionable in these days of electric washing machines as in the old days of boiling clothes and hand rubbing. I've put in an extra window so the man of the house can have a work bench. You will notice the furnace chimney rests on the concrete slab; it is unnecessary to bring it down to the basement floor. (See Sectional Drawing.)


Variegated asphalt shingles
7/8" sheathing
2"×6" wood trusses spaced about 6'0" cs.
2"×4" ceiling joist
2"×4" purlins 4'0" cs.
Interior walls covered with celotex decorated
2"×4" studding
Wood floor
2"×6 beamed ceiling wood moulding composition board
Cased opening
Cased opening
3/8" oak floor on wood sleepers
waterproof composition sheathing 1" cement on National Fabric
4" Conc slab reinforced
Conc. beam
Waterproofing between wood floor and conc. slab
8"×8" conc. col.
8" conc wall
3" conc. floor
conc. footings
SECTION

This section illustrates the type of construction used in the Gleason houses

"I've found that the lowest cost finish for a concrete floor in a dwelling house and the one with the least sales resistance is to cover it with 3/8″ oak strips which cost about $75 a thousand feet delivered in small quantities on the job. They are about 2″ wide. I fill in the in-



Two construction views of the same house equalities of the concrete floor between the sleepers with a cheap, thick, black roofing compound put on with an old broom. Over that we spread the cheapest grade of roofing paper. This gives us a smooth, damp-proof surface on which to lay the strip flooring. We indicate on the side wall the position of the sleepers before we cover them up so it is easy to find the nailing spots. This costs less than linoleum or smooth hard finish for concrete. We use linoleum only in the kitchen and bath.

The Framing

"The frame is of 2 by 4's placed about 2′. About 4′ above the slab are nailed spreaders (see photo). This spreader dodge is something I learned in California. They are required there by the fire laws to prevent the circulation of air in the walls. They also add to the wind resistance when some of the gay little 100 mile an hour breezes come frisking around. And I find them exceedingly useful for nailing the 4′ wide sheathing and the 4′ square National fabric (for stucco) on the outside wall and the 4′ wide Celotex I now use for the inside wall.

"When one is not bound by building codes the most economical length for the studs is 14′. This length, plus the thickness of sill and roof plate gives 7′6″ height of lower story and 6′9″ for the upper. These are the old Colonial proportions—less cubic contents to heat and the low roof line gives a better appearance than a high one to a house 21′ by 24′. The studs are used full length for the two longer sides of the house. For the two shorter walls on which the floor beams rest, they are cut 6′8″ for the lower story and 7′2″ for the upper. By leaving the floor beams open we get 6″ extra height for the lower story without increasing the height of the wall. The floor beams are 2″x6″x12′ supported on 4″ outer wall studs and on a 3″ center bearing partition. This brings the length of the frame outside to 23′10″. The beams are set on 2′ centers. For the upper floor we use one thickness of wood but we place under it some standard make of composition board. It keeps the dust from filtering through and makes a good-looking ceiling for the lower floor. It takes less time to nail it to the top of the beams than to fit it between them after the floor is laid.

Cement Stucco

"The outer walls are of concrete stucco, with the National fabric as a base. Under the fabric we have a sheathing of waterproof pulp board. It is a heavy-glazed card board made according to government specifications for egg and liquid carriers in the parcel post. It costs 1 cent per square foot and comes in large sheets so it takes very little time to attach it to the studs.

"Our inside walls are of Celotex and we finish it by sand-papering the joints and giving it a coat of paper makers' paste, colored to suit. Directions for this treatment of the walls can be had from the New York office of the Celotex company where I first saw it. In this climate I find that the Celotex inside wall makes an unheated house 15 degrees warmer than freezing weather outside.

"I am very keen about the layout we have achieved in our floor plans (and now observe the woman's view of a house plan). Notice the stairs can be used from the service end of the house as well as from the living room. See what lots of space in front of the range. And what wall space around the range to hang cooking utensils. And the chance for an electric fan to take the fumes out of the kitchen into the grade entrance through the partition over the refrigerator. (Electric fans in an outside wall of all kitchens was a little feature of all Miss Gleason's early houses.) How well-placed the refrigerator is. The electric lamp shines directly over the sink and kitchen cabinet—no shadows. And the wall plug can be used for the kitchen or dining room at will. The house plumbing is all in direct line.

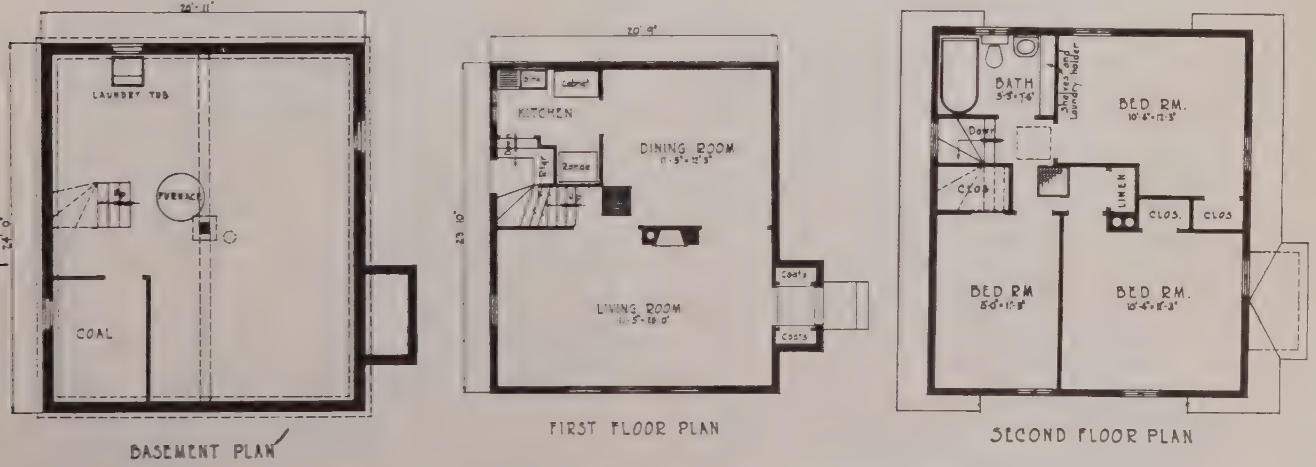
"On the upper floor we get surprisingly large bed rooms for a $3,600 house. All the closet doors have full length mirrors and all the inside door handles are clear glass. Do you notice we get room in the bath room for some good sized towel shelves and a place to put the laundry basket?

Concrete Chimney

"The chimney is built in the wall. That saves a little money and a bit of room. It is made of 8″ cast concrete tile with poured concrete casing. We use the pipeless furnace to which I have been addicted since I started building and we have a register in the upper floor so as not to depend on the stairway entirely for leading some of the heat upstairs.

"The window and door frames are fitted as closely as possible to the walls and we use for trim a molding 1¼″ wide which costs 1½ cents a foot. We shut off the unwanted air around the window frames by going around them with a putty gun.

"Our roof trusses, shown in the section and photo, are out of the ordinary. They are put together on the ground and lifted to place. It is such a simple solid construction that I wonder it does not become standard."



BASEMENT PLAN

FIRST FLOOR PLAN

SECOND FLOOR PLAN

These plans; of the same house shown in the perspective and the section, show the room arrangement, arranged for pipeless furnace heating

The Contractor Builds His Own

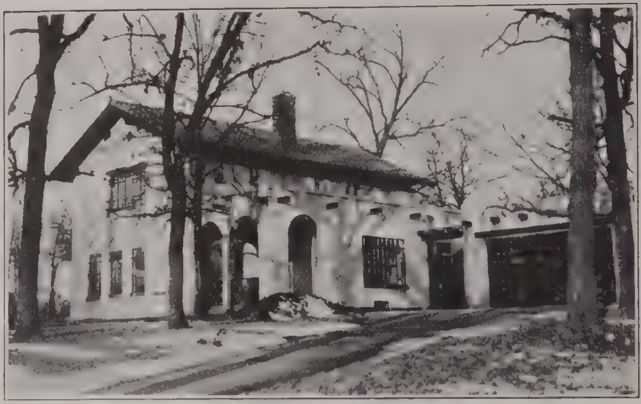
When a Man Is a Contractor and Products Manufacturer He Should Know How to Build Himself a Home That Is of the Best—Here Is the House That E. D. Otto Built for His Family in Order to Get the Best Obtainable

Edgar D. Otto, Downers Grove, Illinois, is a general contractor and a manufacturer of good concrete products. When he built a home for himself and wanted the best that could be obtained for the money he, like others, chose concrete.

Mr. Otto's home represents the sort of a house that the average man desires but seldom secures—a house that will content him for the rest of his days. It is built of concrete block and it is covered with portland cement stucco, and it is lined with cork for the sake of warmth and low heating bills.

One inch of corkboard, secured to the inner walls by cement mortar, eliminated all furring and lathing and provided a firm base for the plaster. The block themselves, such as he turns out of his own plant at the rate of 600 a day, hold a half-inch coat of stucco that is so dense that not a joint shows through—yet no lime was used in the mix.

The secret of the success of the stucco, he says, lies in the fact that he had a good plasterer on the job, mixed his stucco wet so it would be easy to run on tight, and saw that it was put on in the proper manner. The finish coat, made with white portland cement and white limestone screenings, was given a texture that is a combination of rough trowelled and rough-cast work, struck with the steel trowel. The scratch coat was kept wet for two days before the finish coat was applied. The suction was found so uniform that the best results were obtained at a very low cost.

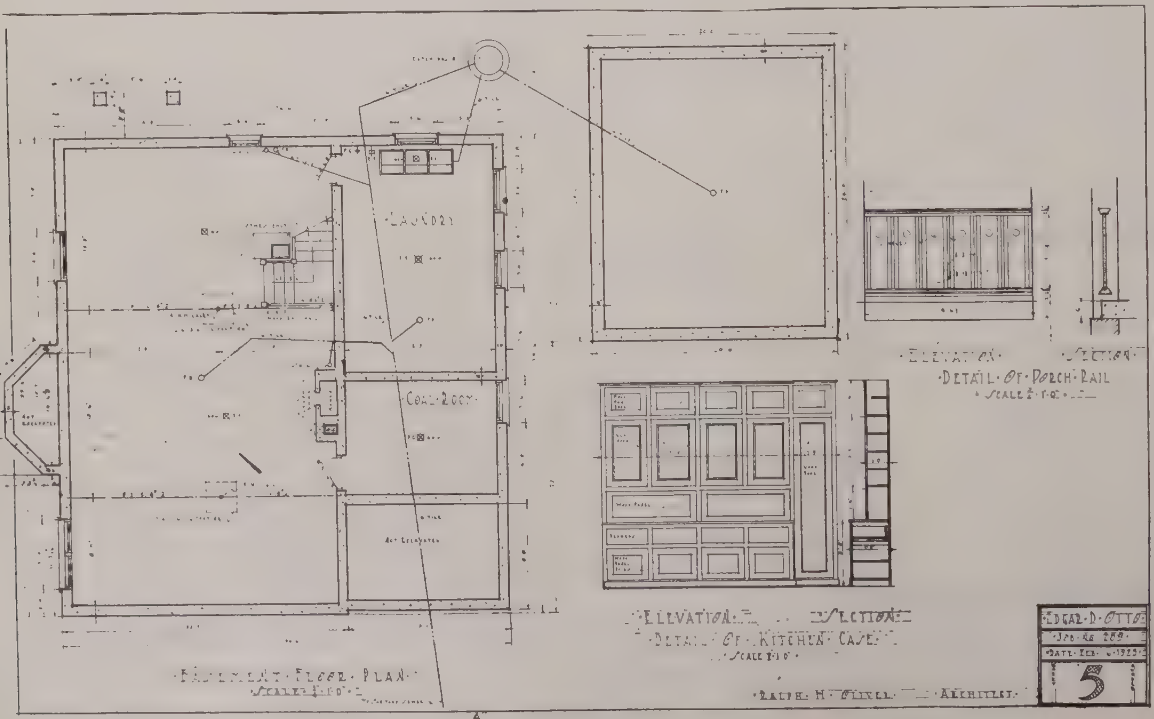


Exterior view of the house after completion, the home that this contractor built for himself

—Ralph H. Oliver, Architect

An interesting feature of the house is the fact that steel sash were installed. Brick sills and wood jambs, together with some efficient work with cement mortar, made it possible to install these in a very handy manner. (Here is a kink that we hope to mention a little later, but which cannot be shown here because of a lack of space.)

Ten inch block foundation walls, resting on monolithic concrete footings, carry the eight inch block walls of the structure, while Lally columns and steel girders carry the

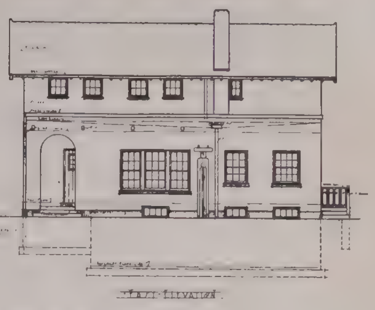


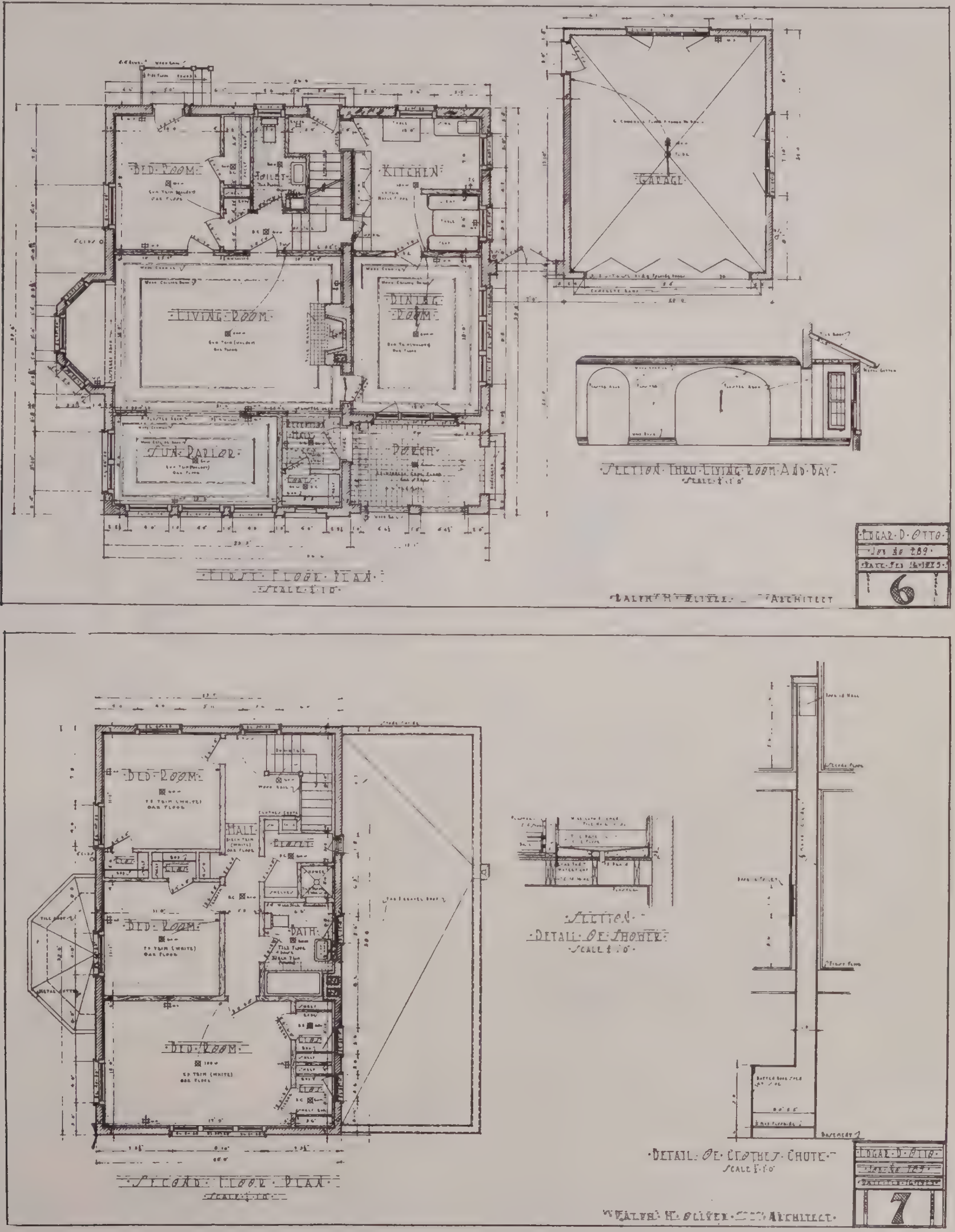
floor loads between the bearing walls. To gain headroom in the basement the joists were carried on the flanges of the steel girders instead of on top of them, as is often done.

The roof of this interesting house is of red Spanish cement tile, while red brick window sills and a soldier course of red brick used as a water table add an interesting note of color in contrast to the white of the stucco. An attractive garage, located seven feet from the house, still further adds to the appearance of the home.

We will not say more, but let the illustrations tell the rest of the story.

Elevation shows the general scheme of the house and garage





These floor plans and details indicate several points of interest

Lehigh to Erect Demonstration Homes

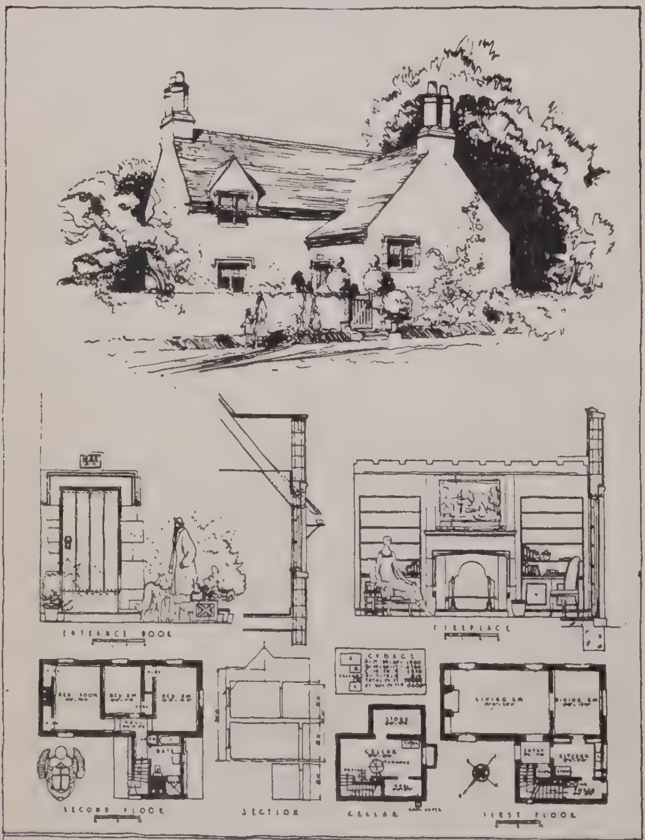
Competition Winners Announced and Selected Plans Shown—Model Concrete Homes to Be Erected in Four Cities — This Will Prove of Advantage to Everyone

A national campaign to advance the cause of concrete masonry construction, planned upon elaborate lines under the auspices of the Lehigh Portland Cement Company starts with the beginning of February. The broad outline of the drive is planned to demonstrate the practical manner to the home-seeker and the home builder, the advantages of concrete masonry materials in small home construction, stressing the economy, the fire-safe quality and the sound architectural features of this type of material.

The actual construction work on the small homes which have been planned to visualize the advantages of concrete masonry construction is to begin at once; but the campaign was really inaugurated last autumn with an architectural competition conducted among twelve thousand architects, in which $4,200 in prize money offered by the Lehigh Company was distributed among the twenty-eight leading designs. The names of the winning architects are announced this month.

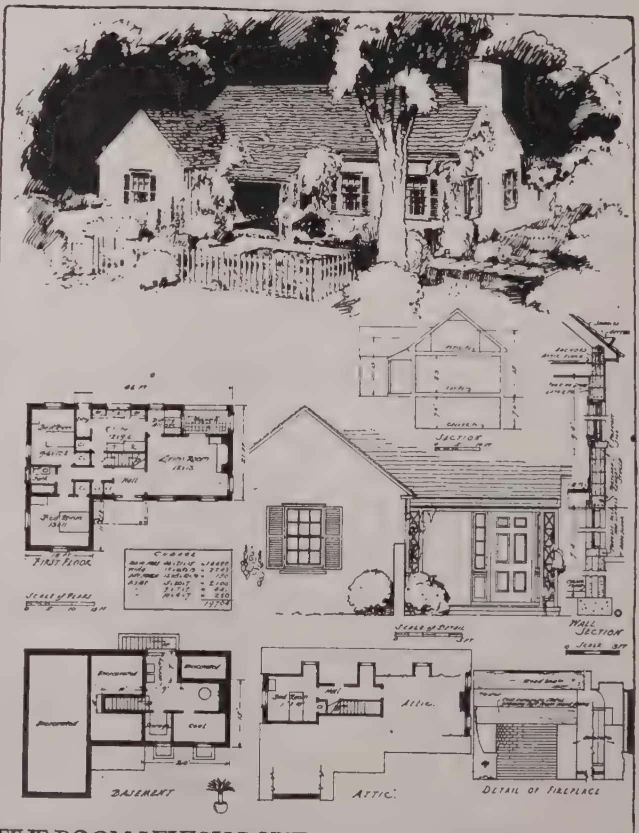
Now comes the second step, the actual demonstration construction campaign, planned to be nation-wide and aiming to impress by actual demonstration the entire building public, home-seeker, architect, contractor, mason, realtor, dealers, and all individuals and businesses concerned in the building field, the many advantages of concrete masonry construction for small homes. The drive begins with the construction in four key cities, located in different sections of the country of small homes and bungalows, from the designs considered most efficient in the architectural competition. Chicago, Kansas City, New York City and Birmingham, Alabama, have been chosen as the locations of these model homes, as offering the widest range of building conditions and the severest test of the efficacy of concrete masonry in winter time construction.

Simultaneously with the beginning of construction work early in February an important campaign of national advertising is to be inaugurated which will link the model house construction to the contractor-dealer houses throughout the country, and should prove to be of the greatest value in educating the public mind in the value



·SIX·ROOM·LEHIGH·PORTLAND·CEMENT·HOVSE·

A story-and-a-half house of English country cottage architectural treatment was selected as the first prize-winner in Class A, the house class. The designer, Angus McD. McSweeney, of San Francisco, also was awarded an honorable mention in the bungalow class which gives him the Grand Prize of $1,000. His total prize money from the Lehigh Competition amounted to $1,550. This house will be built for demonstration in both Chicago and New York City



FIVE-ROOM LEHIGH PORTLAND CEMENT BUNGALOW

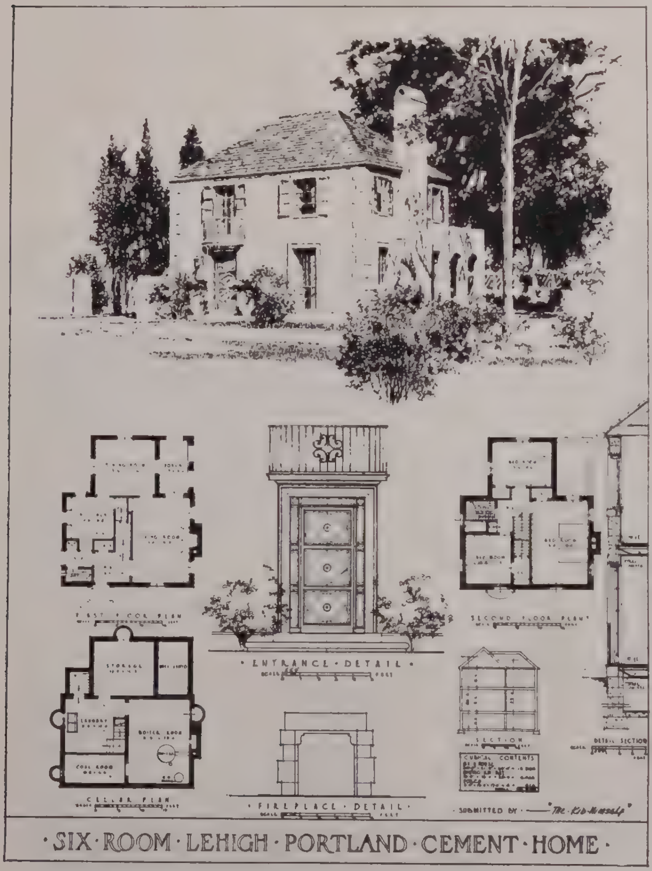
This five-room Southern Colonial bungalow received the first prize award in Class B of the Lehigh Competition. It was designed by John Floyd Yewell and Harry Starr, of New York City, who received $500 in prize money. This plan will be used for the building of the Lehigh demonstration home in Birmingham, Alabama of concrete masonry construction. The advertising campaign will use general circulation magazines, trade journals and newspapers, while in each of the four key cities the model homes are to be decorated, furnished and equipped for public inspection under the supervision of the Home Owners Service Institute. According to the schedule, the demonstration homes are to be completed in April, and will remain open for public view for four weeks thereafter.

Altogether 247 plans were submitted in the architectural contest. Angus McD. McSweeney was awarded first prize in Class A, for two-story, small home design. This brought Mr. McSweeney a $500 prize. He was given also an honorable mention and a $50 award for his bungalow design in Class B, and as the ranking prize winner in the combined classes received the grand prize of $1,000, making his total winnings $1,550. The McSweeney home is to be built for demonstration purposes in New York City and Chicago.

The first prize in the bungalow contest—Class B—went to John Floyd Yewell and Harry Starr, of New York City. This also was a cash prize of $500 and the Yewell-Starr prize bungalow is to be erected in Birmingham, Alabama. The second prize design in the two-story house division is to be built in Kansas City.

The second prize of $300 in the two-story home division was awarded to H. A. Surman, of Detroit, Michigan. Other principal prize winners were as follows: In Class A, for two-story homes, third prize, $200, Emil Backstrom and Herbert Magoon, New York City; fourth prize, $100, Francis Keally, New York City.

In Class B, for bungalow design, second prize, $300, Walter A. Moody, Santa Monica, California; third prize, $200, Frederick H. Reimers, Oakland, California; fourth prize, $100, James N. Holden and Harold A. Rich, Boston, Massachusetts.



A most compact and practical two-story house showing influence of New England Colonial architecture, captured second prize in Class A, $300, for H. A. Surman, of Detroit, Michigan. It will be built for demonstration in Kansas City, Missouri

The twenty architects awarded honorable mention, with prizes of $50 each were distributed among twelve towns and seven states. Seven designs found worthy of honorable mention came from the studios of architects in New York City; two were from Detroit, and one each from Philadelphia, Pa., Upper Darby, Pa., Kansas City, Mo., Auburn, N. Y., Milwaukee, Wis., Portland, Me., and Sacramento, San Rafael, Santa Cruz and Berkeley, California.

The aim of the competition is not only to educate the public in the value of concrete masonry in small home construction, but further to encourage among the leading architects of the country a greater consideration of this type of material. That the competition has justified itself in this connection is amply demonstrated in the wide variety of beautiful designs submitted, which cover every accepted type of modern American architecture. The Lehigh Company will produce for distribution among home builders a plan book containing the prize winning plans, and this reference library of moderate cost small homes will, it is expected, do much to influence the public idea toward concrete masonry construction.

The contest was conducted according to the rules of the American Institute of Architects. Aymar Embury II, of New York, was chairman of the jury of awards. The other judges were David Adler, of Chicago; Charles G. Loring, of Boston; D. West Barber, of Knoxville, Tenn., and H. T. Lindeberg, of New York.

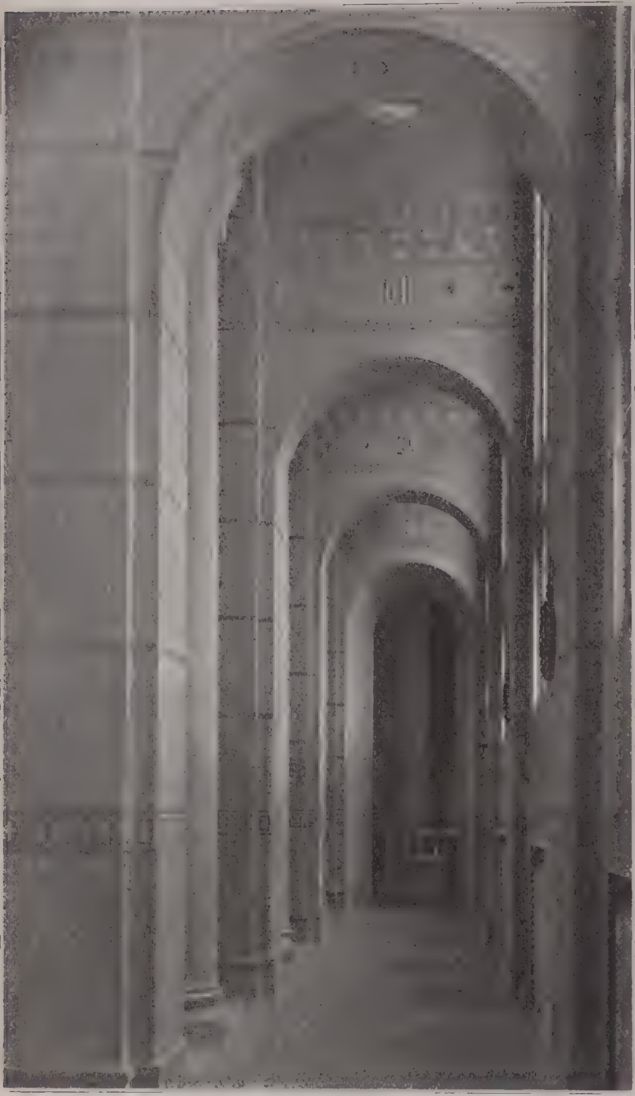
Using Kerosene-Burning Heaters on Winter Job with Success

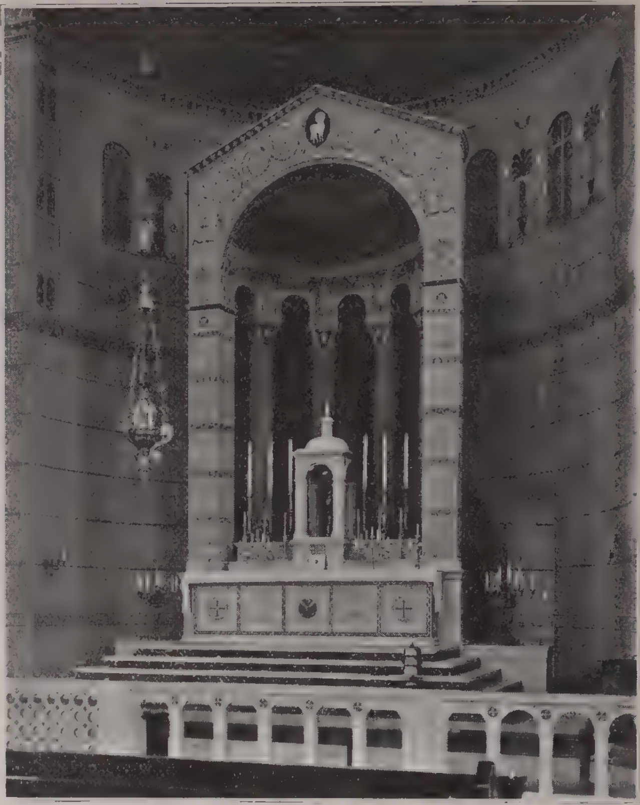
While winter is still upon us it is time to talk of winter methods and winter equipment. Many contractors have found that the use of a good oil burning concrete heater, operating in the drum of the mixer, will eliminate the extra labor costs of heating the materials separately and will raise the batch to such a heat that it may safely be placed in the forms under most winter conditions without fear of freezing—proving that the work is adequately protected.

An interesting case on record is the recent use of this type of equipment on a number of important jobs under construction by the Burrell Engineering and Construction Company, Chicago. This concern, using the heating device manufactured by the Hauck Mfg. Co., on their one-half cubic yard mixers, has found that this method saves about $12 a day for each heater in use, and that the mix is brought to a temperature of 65 degrees Fahrenheit on the coldest days at which the job can be operated. Their heaters are used when the temperature falls below 40 degrees Fahrenheit, and work is not stopped unless the temperature is below 10 degrees above zero. Costs of heating by this method were as low as $2.99 per day and six cents a cubic yard. The A. C. Nielsen Company, in a report on this matter, stated that these heaters paid for themselves within eleven days of operation, and that the work is proving very satisfactory.

The Ideal Concrete Machinery Co., Cincinnati, announces the appointment of the Ginsberg-Penn Co. as agent in New York City. Stock will always be carried and the Ginsberg-Penn Co. will take care of sales and service complete, for the Ideal Concrete Machinery Co.'s customers.

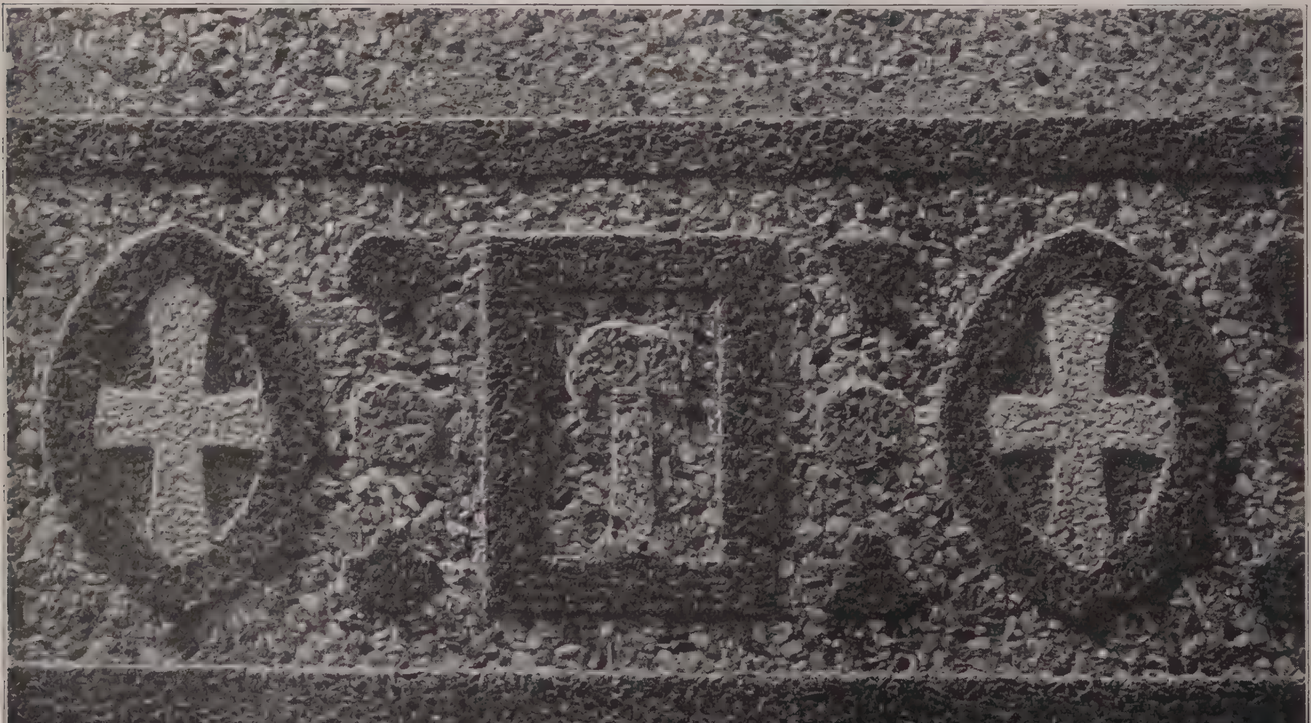
Frank Ginsberg, Hamilton Penn and E. G. Robinson are in charge of the main office at 18 E. 41st St. The service station and warehouse are located at 220 E. 134th St.





The altar with its blue dome marks the high spot of color and delicacy of detail, rich in ecclesiastical symbolism—the Lamb, the Vine, the Peacock tokening immortality, all adequately done in concrete

The beautiful hazy softness of color in these surfaces with here and there a bright and striking note can be but imperfectly imagined from a one-color half-tone print. The little band of detail shown most clearly at the left is illustrated in a close-up of texture (about two-thirds size) below



The Gift of Concrete to the Architect

The Work of John J. Earley, as Exemplified by the Church of the Sacred Heart, in Washington, Demonstrates the Unusual Possibilities of Aggregates in Obtaining Worth-while Color Effects in Concrete Construction—a New Technique Typical of Concrete Alone

By HARVEY WHIPPLE

Many who have not seen the Church of the Sacred Heart in the city of Washington find it hard to realize that in it something of the very greatest consequence to architecture has been achieved with the material concrete. This shrine demonstrated that architects have been given a new medium which adds color to form and form to what many supposed to be a mere brute soundness and a rather dull, sometimes even monotonous permanence. In permanence we have a far richer meaning when to a continuity of practical service there is added the preservation of aesthetic value.

The Church of the Sacred Heart is an answer to all skeptics. It establishes the material concrete where before only a few of the livelier imaginations ventured to enter. When the annals of concrete can be written with time's clearer perspective, they will scarcely fail to record that John J. Earley, fifth in a direct family line of architectural sculptors, approaching the study of concrete from the viewpoint of an artist, with a new angle of thought and dismayed by none of those mental habits which have grown up with the material, brought it up out of the worthy but drab servitude of mere strength and gave it color—the color of a La Farge window or the rich mellowness of an oriental rug—and that he discovered in it a wonder-working and obedient jinni, to serve an art which for centuries had been seeking a swift and permanent medium, unhampered by the slow, costly craftsmanship of marbles and the older mosaics.

It is as a mosaic that Mr. Earley's concrete must be thought of. One of his fundamental conceptions of the larger usefulness of the material was this: It must achieve its character through its aggregate, its major component, rather than through its cement, its minor part. Cement is, after all, only a fortunate means at our command for holding aggregates in a permanent composite.

Instead of being placed laboriously, piece by piece, as the mosaicists had always worked, this new mosaic is conceived as a plastic. With water as a vehicle it is flowed into place; cement, hardening, keeps it there but is completely cleaned off the exposed surfaces; the result is dominated by the aggregates.

The artist must first command the aggregates, a color repertoire of the widest and clearest color range. He must learn what sizes of particles and what mixtures of various color particles will have just that light reflecting quality suited to each design; otherwise, color, which so enriches our experiences, becomes a mere riot—blatant jazz, rather than harmonious symphony.

The artist must next command the technique for getting his material into place, keeping it there, with a reasonable certainty of what he will find when the molds or forms are taken away and the surface cement removed. The difficulties in the development of such technique, are known (oftenest unsolved) to plaster and stucco workers and to some who have done good work in precast ornamental concrete. Concrete requires a greater volume of material to fill a given mold than other plastic materials; more water must be used as a vehicle than is needed to effect the desired chemical activity of the cement. This additional water has a tendency to permit the coarse and the fine material to segregate, a tendency which, if not overcome, immediately defeats the purpose of homogeneity of the mass and of precise control of the character of the exposed surface. There is a tendency too for the solids to go to the bottom and leave the liquids on top and for the coarse materials to fall away from vertical surfaces and from the under side of horizontal ones. And, as has already been mentioned as very important, since it has given us the wrong conception of the material, there is that tendency of the cement, the minor constituent of the plastic material, to dominate the color and the texture. The usual recourse has been to evade this tendency by coloring the cement and permitting it to continue to hide the aggregate.

Mr. Earley crowds his concrete full of aggregate, with the least possible surplus of mortar to make cementy seams, pockets and patches. One of his workmen filling a baluster mold, first placed a fairly mushy mixture and rodded it—rodding it thoroughly and painstakingly, thus bringing mortar and cement paste to the top. Into this, more aggregate was placed and the thorough rodding continued. When all the surplus paste had thus been put to work, more of the mushy mixture was placed—then more rodding, more aggregate and so on. When the mold was filled, it was allowed a little time to settle—to "take up" as the workman says it, but so thorough had been the placing that the settlement was slight. Again the mold was filled and dry material heaped over the top, this serving as a blotter to remove the last vestige of surplus water.

Again, a fragmentary detail of technique: Much of the enriching color work of the Church of the Sacred Heart is done with precast tiles or plaques. The elements of the design are traversed by minute ridges, tiny fences, in the flat plaster mold. To see an artisan working from a full size color cartoon, placing little dabs of the various cement and aggregate mixtures in their proper places, is to be impressed with the apparent harshness of the mixtures employed. Here Mr. Earley has departed from practically all if not all other workers in architectural concrete. Smooth, easy-working mixtures have been the rule. It must merely be remembered that Mr. Earley's conception of this work is as a mosaic. He deals with definite and sizable particles, so that the resulting color influence is much stronger than in a mixture of very fine particles

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Note—Acknowledgment is made, especially for the quoted passages which generously supplement personal observation, to Proceedings, American Concrete Institute; an address by Mr. Earley before the Portland Cement Association in November, 1925, and a very beautiful brochure illustrated in color and published by the Atlas Portland Cement Co., containing articles by Mr. Murphy and Mr. Earley.

where each piece must still be surrounded by its own little film of cement paste, the sum total of which vastly dilutes the color, not of each particle of aggregate, but of the net surface from which the eye takes a blended result.

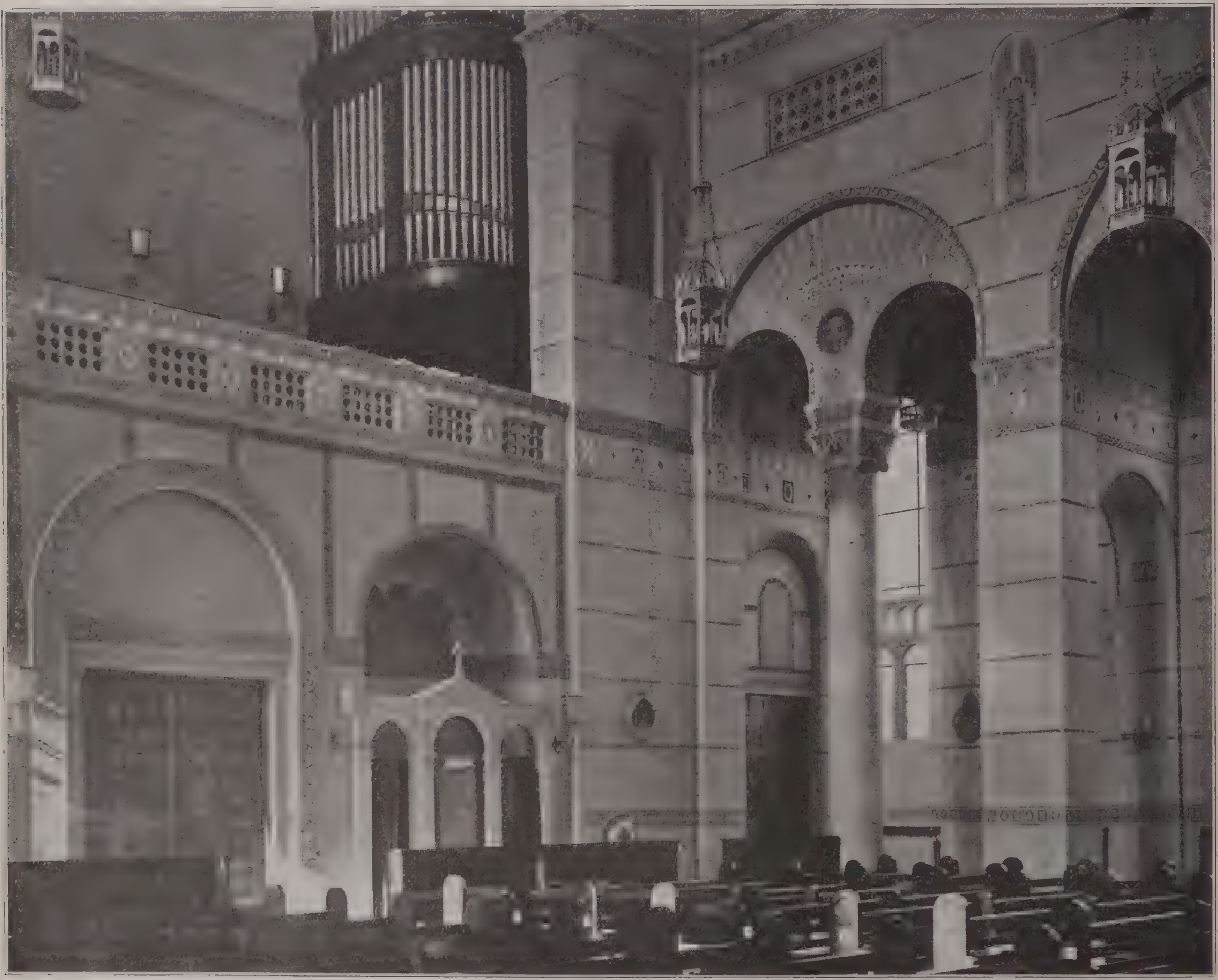
There is no thought here to describe the elements of the technique which Mr. Earley has been developing for a dozen years. That would be a presumption. If that technique is to be a legacy sometime to other artists and craftsmen, Mr. Earley will have to set down the record of it. These fragmentary observations are merely for a better understanding of some of the fundamentals of concrete surfaces, conceived and achieved from the viewpoint of a plastic mosaic.

Given, then, the wide range of colored aggregates, good in themselves and as blended in combinations, and with them a thorough-going technical understanding of just how cement and concrete behave—all their peculiar characteristics and eccentricities—and out of this knowledge a technique to turn these characteristics to account, the resulting architectural achievements are limited only by the beauty of the architect's design, worked out in sympathetic understanding of the material, and the skill of the craftsman in giving it reality.

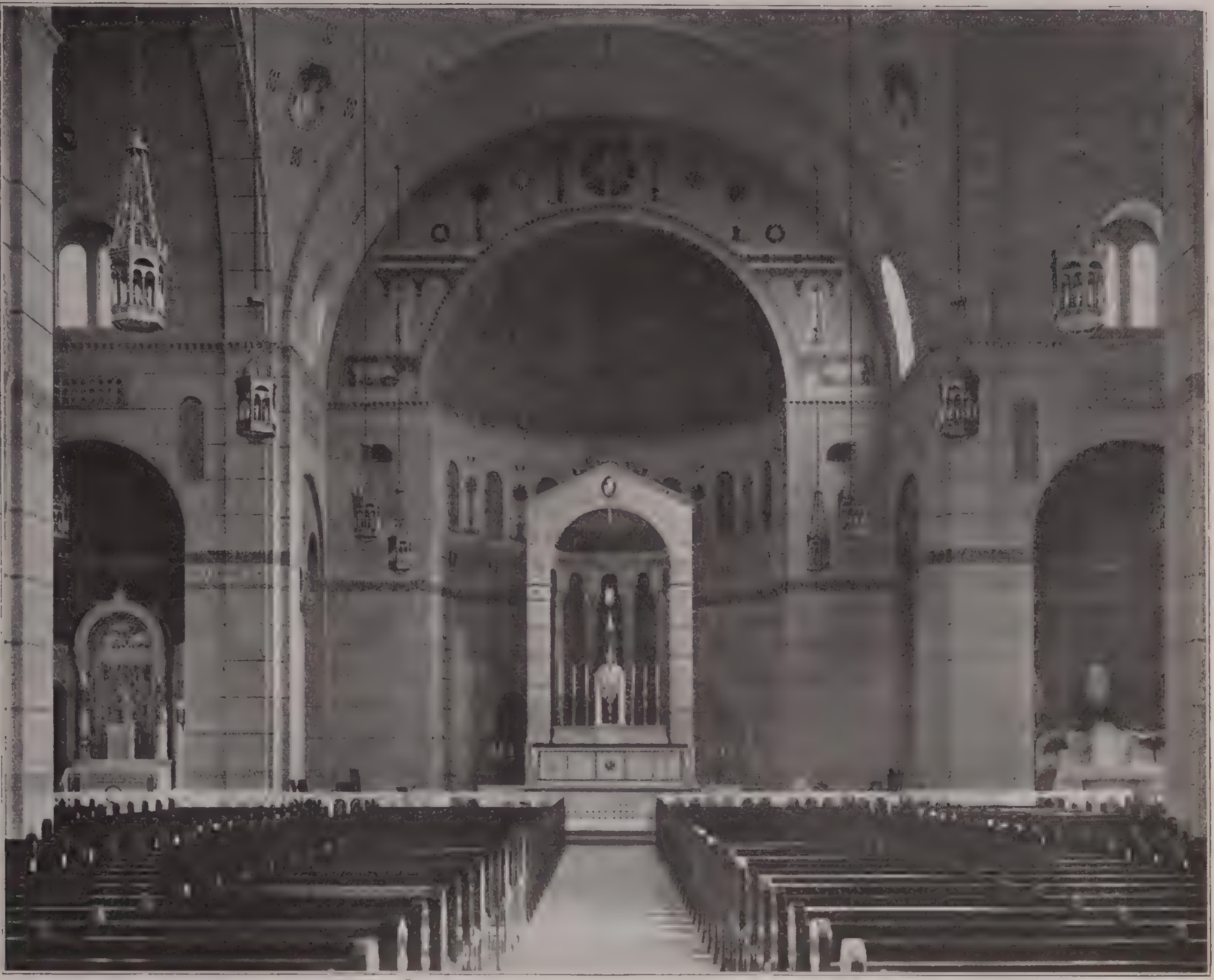
The range of architectural possibility is more clearly understood when it is realized that the architect is not limited to any one of the several methods for concrete's application. Many an architect or manufacturer of concrete stone has been baffled by the seeming impossibility of making a piece of work cast in place, match in color and texture a part of that work which was precast in the shop; or in shop work alone, the seeming impossibility of making a piece of dry-tamp work, done in an open-side mold, match a baluster or finial done in a mold, all but closed, in which a fluid mixture was necessary. Again, they have been baffled by the seeming impossibility of applying a similar mixture as a stucco which would match any of the rest. What problems have been solved in the development of Mr. Earley's technique may be judged by examples of his work in which it is all but impossible to distinguish, so far as surface color and texture are concerned, among three kinds of work—that which was cast in place, other parts done in the shop, or large flat surfaces applied with a trowel.

With such a technique, with an artist's pallet affording all the natural marbles of the older mosaics, with other natural stones of great beauty, suitably crushed for aggregates, but too hard or otherwise unsuited to the traditional crafts of architecture, and with a further range of color possibility afforded by crushed ceramics, burned to definite color result—with such equipment and with favorable evidences of his skill in several buildings in Washington and the Fountain of Time in Chicago, Mr. Earley was eager for just such a test as the architects, Murphy and Olmsted afforded him in the Shrine of the Sacred Heart.

The architects had no desire to reproduce some historic



Here we see another corner of the edifice, wherein concrete, with skilfully rendered mosaics in colored aggregates, affords a wealth of color



Shrine of the Sacred Heart, Washington, D. C. Murphy and Olmsted, Architects, in which concrete, given the difficult task of the interior decorative treatment of a church edifice, in rich Romanesque detail, satisfied every requirement as a complete architectural medium. The work of the studio of John J. Earley, Architectural Sculptor, Washington D, C.

example of church edifice. Their inspiration is frankly traceable to northern Italian styles. The Sacred Heart Shrine is richly Romanesque. The plan is cruciform with wide nave and colonnaded side aisles. For the interior decoration the architects would permit no imitation. "Every effort was made to avoid invading the province of one material with another, because it was desired that the result finally outlined should be judged upon its own merit and not on merit obtained through reminiscence of historic examples executed in totally different materials." Mr. F. B. Murphy has written further:

"The broad use of color on the interior was suggested by the extensive areas of the walls, vault and dome, which in the Romanesque period were decorated through the free use of rare marbles and mosaics, rich in color and interest. These materials are no longer available for such large areas within the limits of permissible cost, but the decorative need remains. For we still feel that walls should be covered with an enduring material of such character as to express the elements of design—piers, free-standing columns and arches.

"In the search for the materials that might ably render with permanence the complicated decorative detail desired on the interior, concrete, which through a new technique has been made an architectural medium of the highest order, was carefully considered and finally adopted. No hesitancy was felt because of the nature of concrete, for it was frankly accepted as a strong, durable and structurally satisfactory material. The problem was whether concrete, through the new technique, would be sufficiently versatile to yield all the intricate detail and variety in color necessary to successfully carry out the design. Precedent of a rich and varied nature was unavailable; little, too, was gained by a perusal of the documents on the subject. The failure could be great but the possibilities of success were most liberal, and were fully realized.

"The project was first considered as an abstract problem of decoration and was drawn and colored as seemed best. The design was then translated into the technique of architectural concrete of which the colors and textures were immediately available in their final values. These colors and textures were then studied in relation to the lighting peculiar to this interior, both with regard to the natural light emanating from the stained glass and to the artificial light."

It was important in the architects' view that the architectural treatment be of a permanent character. "All transient qualities were avoided and the flimsiness which so frequently designates, in outstanding insincerity, a too large number of the edifices erected to the glory of the Almighty, was supplanted by the straightforward employment of such honest materials as could be brought within the purview of the financial outlay."

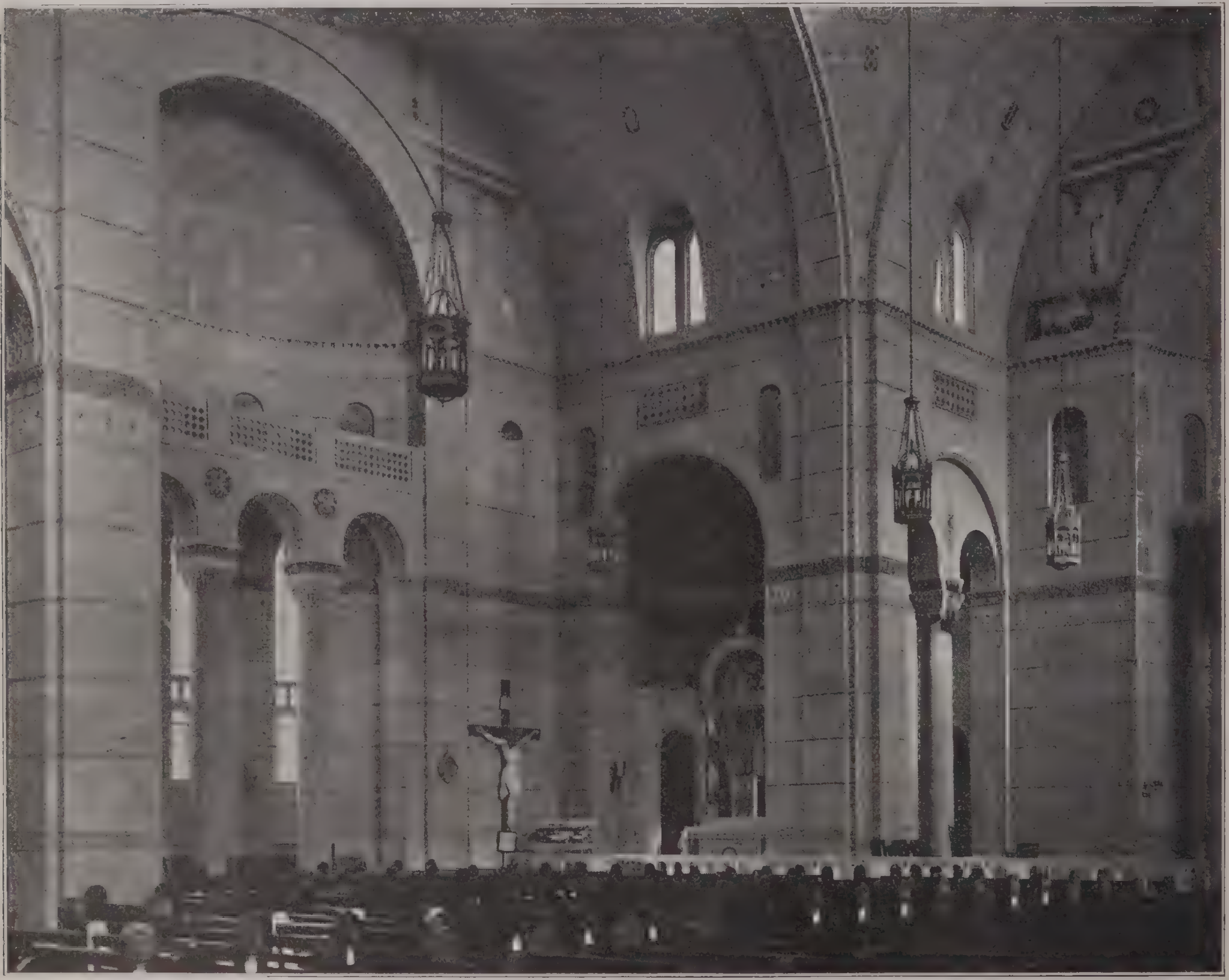
It is pointed out by Mr. Earley in an expression of just what the material concrete means to him, that craftsmen have always appreciated the value of plastic materials in putting work into three dimensions, because plasticity means facility in transferring the artist's conception and model into finished, physical form. Facility in the crass terms of the market place—and the market place is always to be reckoned with in fixing the amount of art we shall have in the world—facility means economy. Economy, however, is not enough—there must, for the artist's purposes, be permanence as well. Plastic materials in common use did not possess the desired permanence, especially for rigorous and changeable climates, so plastic materials were largely eliminated from construction until concrete was developed. Of the architectural value of concrete, Mr. Earley says:

"When we learned that the aggregate would be the dominating element of the architectural concrete and that the character and position of the particles could be controlled, there was opened to us a treasure of color, knowledge and experience such as we never dared to hope would be at our disposal until it had been developed for this new material through time and by experience. By considering the particles of aggregate as spots of color in juxtaposition, all the knowledge and much of the technique of the impressionist or pointillist school of painting, was immediately applicable to concrete.

"This school places color spots, side by side with one another, in such a manner that they blend in the air to hues of even value and chroma. The wonderful clarity of color, the vibrant quality of surface, which distinguishes the paintings of this school, are found also in the concrete. Colors for which no aggregate has yet been found—purples, blue-greens and yellow-reds are successfully made; simple colors, such as blue, green, and yellow are blended in various ways, producing remarkably beautiful compound hues, which may be added to the number of component colors as follows: Blue, blue-green, green-blue, green, green-yellow, yellow-green, yellow. This wonderfully increases the number of colors available from a smaller number of good aggregates.

"The enrichment of our palette is of inestimable worth. Such a multiplicity of hues is the property of architectural concrete, unequalled by any other masonry material; in fact, it is rivalled only by the great medium of the mosaicist which, however, is not adaptable to form in three dimensions. One must not imagine that the blending of colors is as easy to do as to suggest. Success can be assured only by the highest technical skill in the use of aggregates, by colors which are sufficiently pure. Any red and any blue will not produce an acceptable purple, and only hues which have been properly balanced, as to value and chroma, will produce satisfying results.

"Concrete is so wonderfully responsive that it has wound a spell around me and around the men in my studio. When the work is taken from the molds each morning and the colors are exposed, there is something so spectacular, so magical about it, that our enthusiasm never abates. Many of the men have fallen under the spell to



Here you see concrete in its richest realization of form and color. Walls, columns, arches, pierced balustrade and many details of great delicacy, all concrete such an extent that they object to working with other materials. Architects and artists who have used concrete feel this attraction just as much as these craftsmen."

Finally, in an effort to round out the sense of just what concrete has come to mean to the artist and the architect let us abstract here an incident related in the writings of Vasari as drawn upon by Mr. Earley in a recent address:

At one time in the city of Florence there stood a huge block of marble, destined to be a giant figure to adorn the Cathedral, but it had been spoiled by the sculptor, Simone De Fiesoli. It stood for nearly a hundred years, too valuable to be thrown away and too irregular, it seemed, for use until it came under the hand of Michel Angelo Buonarroti, who made a model in wax of a young David with a sling. After the model was made and the work of the artist was really complete, it had to be done in stone. To accomplish this, Michel Angelo spent three whole years in a frenzy of work, driven by his impetuous nature, making the chips fly, the hardest of toil, so that his design might be translated into something permanent, his statue released from the marble in which it lay concealed. If Michel Angelo had known concrete as we now know it he would have filled the world with his art.

"I am sure you will be surprised," said Mr. Earley in the same address, "when I remind you that the labor attendant on the execution of works of art has continued undiminished until our day. There is only one exception, the relief afforded by the genius of Luca Della Robia when he learned to make glazed terra cotta serve his use. In the history of his life we read the same protest of the artist against useless, blighting labor. 'His fertile genius, ever seeking for new means of expression, could not rest content with the slow production of works in bronze and marble. . . .' "

Then there was the extraordinary theme, the Fountain of Time of the modern sculptor, Lorado Taft, who having completed a gigantic model, was unable to reproduce it in a permanent material because of the costly labor involved. The model was already beginning to disintegrate when Mr. Earley, by constructing a plaster mold of nearly four thousand pieces, over the original, was able to reproduce it in concrete.

Of this work Mr. Taft said: "The fact is we were cornered. We were up against it. The monument had grown to be so long, so high, so complicated that I couldn't even get a bid on the carving of it."

Then he found Mr. Earley and interested him in doing it in concrete. Of the result Mr. Taft said this:

"I was not prepared for the beautiful result which has come to me. There is not a stone that America produced —not a material, not even Tennessee marble, that I would prefer to the color and effect we have down there on the monument."

Question-Box a Feature of A. C. I. Convention

Some additional topics to be discussed at the Chicago convention of the American Concrete Institute February 23 to 26, are as follows:

Frank H. Alfred, president and general manager of the Pere Marquette Railway, who has recently gone on record favoring a better type of track support, one of reinforced concrete for economy and speed on heavy traffic lines, will present a paper on this subject at the open session of the convention, Tuesday afternoon, February 23.

This will be followed by a discussion, in which a number of railway engineers are invited to participate, on "Railroads and Concrete," in answer to the question, "Just how far have the railroads gone in a progressive attitude toward modern design and construction with concrete?"

The session Tuesday evening, February 23, will feature a Question Box. The ten questions to be discussed are as follows:

1. Given a sudden cold snap in the course of concrete building construction, with a lapse in cold weather precautions, or a suspicion in the mind of the engineer in charge as to the possible inadequacy of covers or heating, what is to be the basis of subsequent judgment as to when forms shall be stripped?

2. What has experience taught in construction and in concrete products manufacture as to variations in hardening properties of standard portland cements at various temperatures and under special conditions of placing and curing? Are standard cements relatively uniform under ordinary conditions?

3. By what methods can high early strengths be obtained with standard portland cements?

4. Has the experience of builders with centrally mixed concrete (where sold and delivered commercially) been satisfactory?

5. How can you apply the principles of accurate quality control to the making and placing of concrete on small jobs?

6. In earth-filled highway arches what is the most suitable waterproofing practice?

7. What methods should be used for economical but thorough placing of concrete in deep beams having a large number of closely spaced reinforcing bars?

8. What is the added cost of irregular spacing and the advantages or disadvantages of extreme refinement of design?

9. How shall we make plaster bond to relatively smooth concrete surfaces?

10. What experiences have indicated that cracks developing in concrete can be healed?

The session Wednesday evening, February 24, should be of very general interest in an architectural way. John J. Earley will discuss these two themes under the general heading of "Architectural Concrete."

First, from an architectural standpoint, "The Finish and the Structure of the building should be completely separated."

Secondly, from a craft standpoint, "Time is an element in the making of concrete."

The background for this discussion will be his work on the Tennessee Parthenon and the Louisiana State University Group at Baton Rouge.

David C. Allison of Allison and Allison, architects, Los Angeles, will present a paper discussing, first, briefly the structural principles in our present day steel and concrete buildings as differing from the structural principles upon which traditional architecture is based.

This will be followed by an address by A. O. Malone, a master craftsman in stucco, who will demonstrate on the floor of the convention, the actual application of stucco in new textures.

The Wednesday morning and afternoon sessions have already been pretty completely outlined covering the field application of quality control methods for concrete. Thursday morning will be devoted to technical aspects of concrete building units. Thursday afternoon will be devoted to an inspection of work actually in progress in quality control of concrete on the Wacker Drive, a twenty-five million dollar public improvement. Thursday evening will be devoted chiefly to concrete floors and concrete roads. Friday morning will receive papers and reports bearing chiefly on interesting test investigations of concrete as already outlined.

Straight Line Production in Block Plant

Most Modern Production Methods and Equipment, Plus a Permanent Structure, Make New Elmhurst-Chicago Plant a Model of Efficiency—How the Plant Is Arranged—Equipment Used—The Production Scheme—Labor Required

What is said to be one of the most modern concrete block plants in the middle west has recently been put into operation by the Elmhurst-Chicago Stone Company, at Elmhurst, Illinois, a suburb of Chicago. In its design every convenience is incorporated to reduce manual labor, increase production, and improve the quality of the product—not to mention the consequent reduction of operating and manufacturing costs. The maximum number of block per man per hour is thus realized—with a minimum of effort.

This new plant, a model for the development of others, is an outgrowth of a smaller and older one that has been operated by the same concern. The owners are operators of a large quarry producing crushed limestone for the Chicago trade, and have a daily output of 2,000 cubic yards of crushed stone. In the production of this material there is a plentiful supply of screenings too small for other purposes but just the thing for aggregates for the manufacture of concrete block. About 20 years ago, the late William Hammerschmidt, who owned and operated this quarry, determined to utilize this surplus material and installed a small block plant. That plant has been in continuous operation up to the recent opening of the new plant, whose construction recently became justified because of the growing demand for concrete products in that suburban district. In the original plant, at first, only hand machines were used, but later power equipment was added.

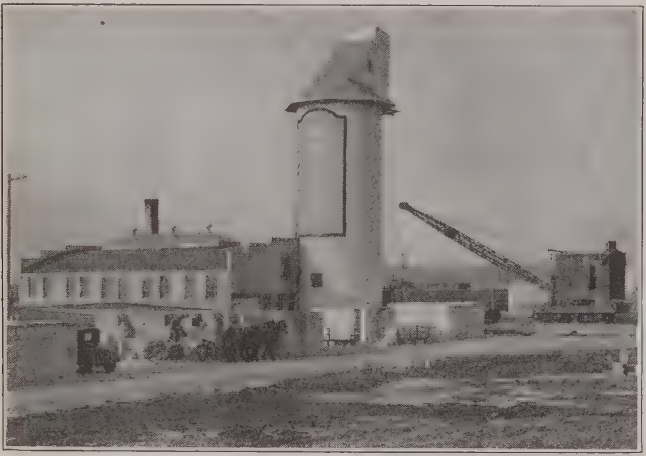


Fig. 1—New concrete block of Elmhurst-Chicago Stone Co., one of the finest in Middle West.

The new plant, designed and equipped with the aid of the Thomas W. Noble Company, Chicago, was constructed during the past year to take care of the growing business of the company. A combination of the manufacturer's own block, and reinforced concrete, the new plant is built to fit the process, instead of trying to fit the process to the plant.

Material Supply

The aggregates are delivered by means of open-top cars, operated on a standard gauge railway running between the crushing and screening plant at the quarry and the products plant. These cars are operated and unloaded by a locomotive crane. The screenings are placed in storage piles near the plant or unloaded directly into the hopper at the base of the storage bin as desired, while the same crane, equipped with a clamshell bucket, transfers aggregates from the storage piles to the bin as required. Cement is delivered by rail and unloaded from the cars directly into the plant by means of the unloading platform that is on the same level as the car floor and the cement-storage floor inside the building. The aggregates deposited in the hopper at the base of the bin are raised by means of a bucket elevator and placed inside the bin, to be carried to the charging cars by means of gravity.

The Plant

This products plant occupies a new building constructed entirely of block manufactured in the older plant, and was specially designed for the purpose. The floor plan is shown in Figure 3. Panel faced block were used, and the building presents an exceptionally attractive exterior, as may be seen in Figure 1. In one corner is a monolithic concrete storage silo that holds the stone screenings used as aggregates. Along one side are the low curing rooms, built of block.

On entering the workroom, which is a daylight shop, 46 ft. by 65 ft. with 12 ft. sidewalls, one fails to find evidence of the crowded condition seen in so many products plants. Instead, the room is amply large and affords plenty of convenient working space for even more machines than are now installed. The use of frame trusses to support the roof eliminates columns that otherwise would have interfered with the placing of the machines. In addition to numerous windows, a skylight provides for adequate illumination by sunlight during normal working hours, and artificial lighting is not required.

Along the rear wall of the workroom, and extending under the storage bin, is a reinforced concrete platform for the storage of cement and for use as a charging plat-

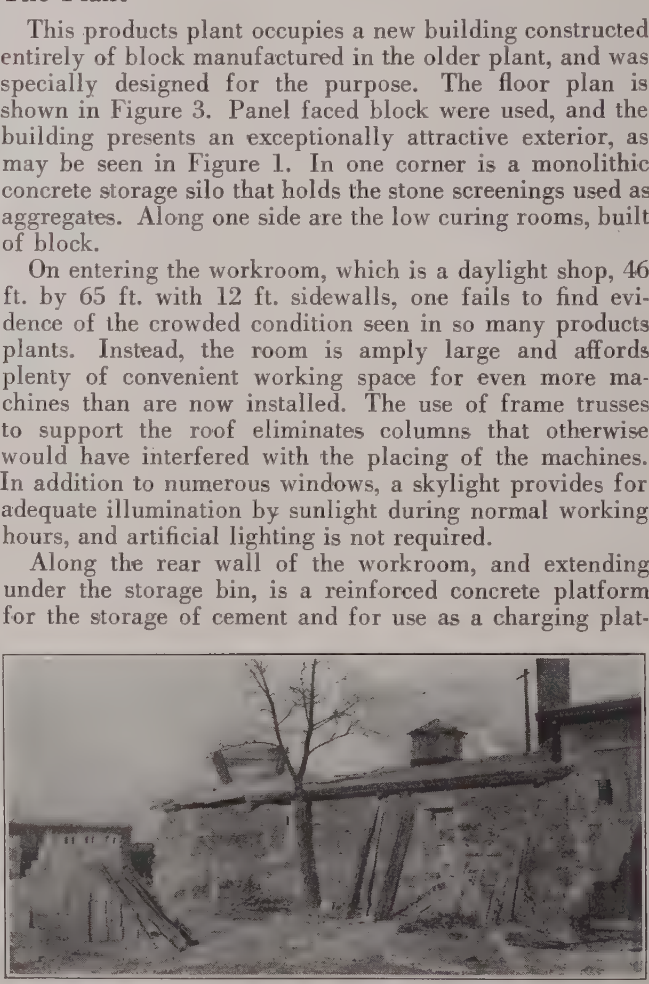


Fig. 2—A study in contrasts. Old plant of Elmhurst-Chicago Stone Co.

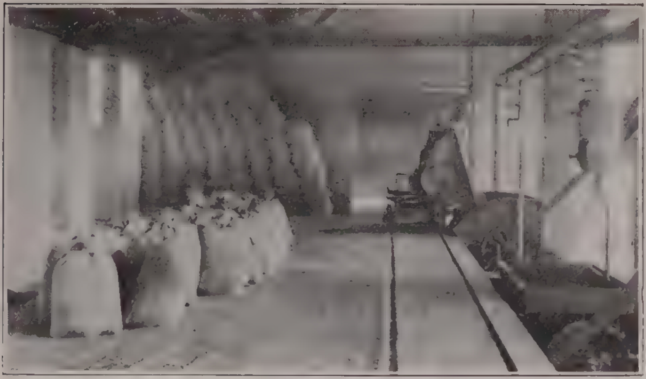


Fig. 4—Cement storage and charging platform—operator charging Ideal 14 ft. mixer.

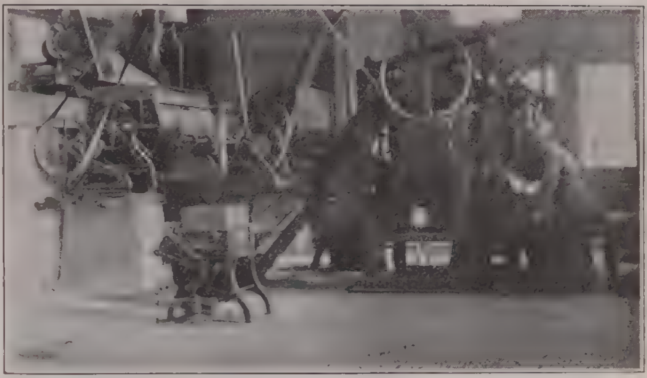


Fig. 5—Interior view of plant—Universal Heavy Duty Block Maker in foreground.

form. It is 15 ft. wide and 7 ft. above the floor level. A portion of the space under this platform or balcony is given over to a boiler room, coal bin, and shop lavatory. The rest of the space under it, about 37 ft. by 15 ft., is used for the manufacture of concrete sills, steps, and other dimension stone.

The aggregate storage bin, the reinforced concrete silo mentioned above, feeds the aggregate to cars running on the charging platform. This storage structure, cylindrical in plan, is 50 ft. high and has an inside diameter of 18 ft., and a capacity of almost 7 carloads of screenings. It is divided into four compartments by two vertical partition walls at right angles to each other, making the horizontal section of each compartment a quarter section of a circle. This provides for later use of four different gradings of aggregate, to be regraded to obtain the desired strengths at the time of withdrawal. One grading, ½-in. to dust, is now used. The gates at the bottom of this silo are close enough together for convenient discharging into the charging car. The storage bin is arranged for the later installation of steam coils in order that aggregates may be heated in winter if this is found to be necessary.

Fed by Bucket Elevator

This bin, as above indicated, is fed with the aid of a bucket elevator that receives screenings unloaded by means of a crane from the gondolas, or from the stock piles in the yard. Later a track hopper and apron feeder will be installed to deliver screenings from the car to the elevator. Dump cars will then be utilized. The bucket elevator, a Stephens-Adamson outfit, is driven by a 10 h.p. electric motor. The buckets are mounted on a 12 in. leather belt. At the top of the storage bin a system of sliding chutes permits the delivery of aggregate to any one of the four bin compartments desired. The bottom of the bin is equipped with four sliding bin gates. The bin has a large sign painted on it, blue and white, advertising "The World's Finest Concrete Block."

The aggregates are received from this storage bin, by gravity, into a ¾ yard Chase dump car, operating on the 24 in. gauge charging track along the front edge of the charging platform. The inside of this car is marked to indicate to the mixer man when he has admitted the correct amount of aggregate. When the car has received its supply of screenings it is pushed by hand along the charg-

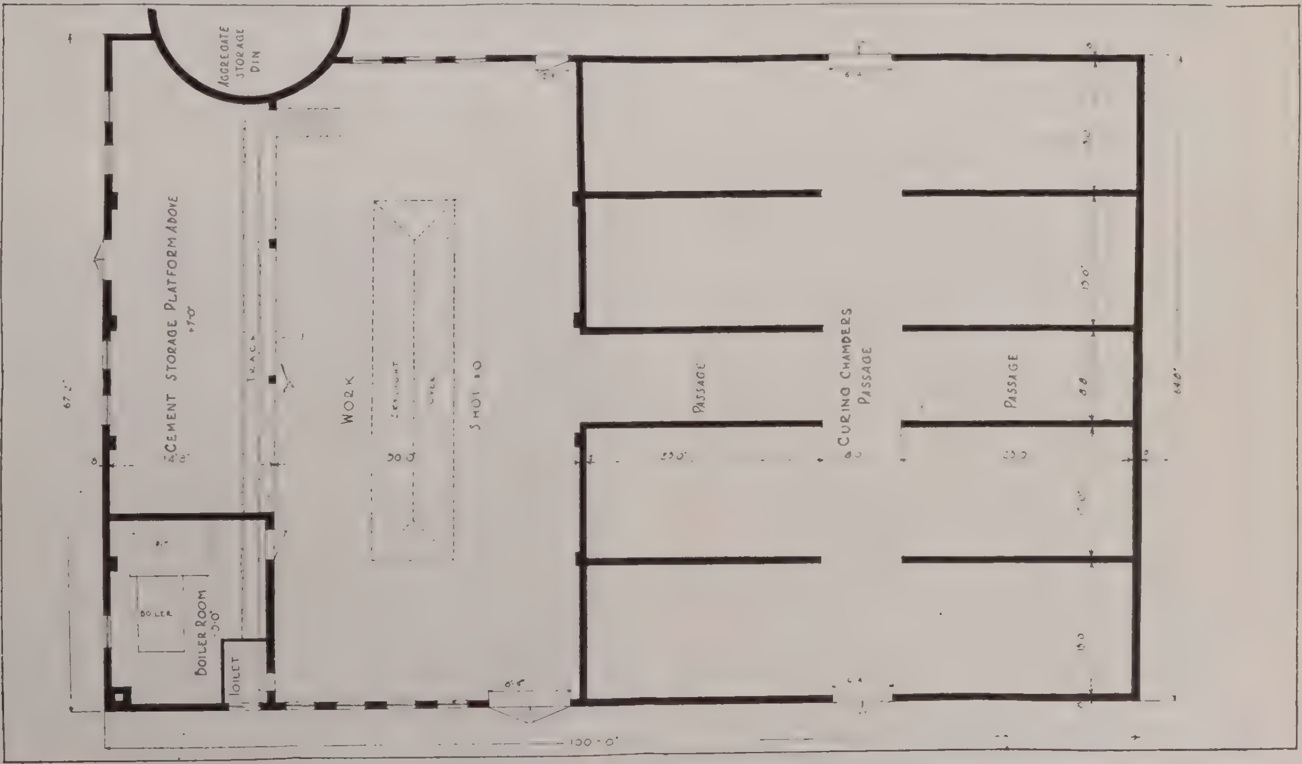


Fig. 3—Floor plan of new concrete block plant—note arrangement of curing rooms.

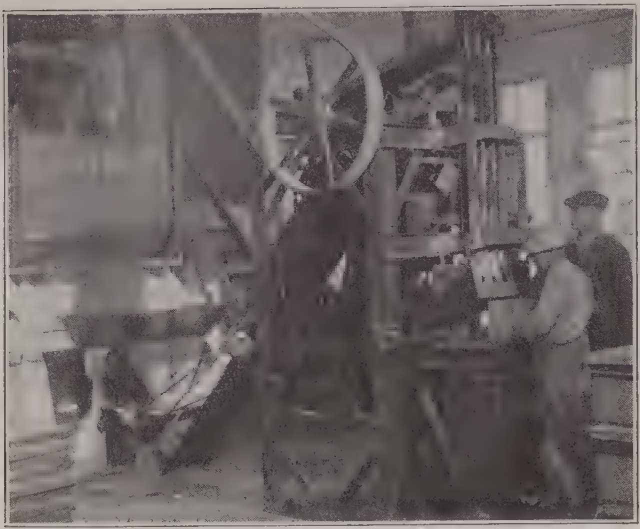


Fig. 6—Universal Automatic Stripper and Ideal 14 ft. Mixer.

ing track to the rear of the mixer, where a sack of cement is placed in it. The mixers are charged by simply dumping the contents of the car into them.

The cement is stored in sacks on the platform, after being trucked in from the cars. That operation is made easy since the charging platform, unloading platform, and car floor are all on the same level. One brand of cement is chosen as standard in this plant, for the sake of uniformity and reliability, and it has been found to be advisable to adhere completely to that policy in purchasing cement. Medusa White is used for facing block, and Medusa waterproofing is put into the facing material. Four carloads of cement can be stored on the platform. The platform also contains a handy sack cleaner and baler.

An advantage of this platform and handling method is that all dust incident to the handling of cement is confined to one place in the plant and does not interfere with the men at the machines. Ventilation of this dusty platform is easily afforded without inconvenience to the working force on the floor below.

Mixing and Feeding

The mixers are charged by means of the dump car on the platform. Three mixers, each of 14 ft. capacity, are thus easily handled by one mixer man. Aggregates and cement are mixed dry for two minutes before the water is added. A water line, extending over the line of mixers, is equipped with a valve at each mixer, under present arrangements. It is planned, however, to equip each mixer with an automatic water measuring tank, and experiments are now being conducted with that end in view. At present, the visual method is used to judge the consistency of the concrete.

The mixing equipment at present includes a 14 ft. Ideal mixer to prepare material for the Universal stripper, and a 14 ft. Blystone mixer to serve the heavy duty block machine. Side door discharge is provided on each mixer. The mixed concrete is thus discharged into the feeding hoppers at the foot of the elevators of each machine. These feeding hoppers are equipped with a reciprocating feeding device that supplies the concrete to the elevator gradually and prevents the elevator from stopping or stalling on account of becoming choked with an overload. Elevators on the block machines are of the scraper flight type and are controlled from the front of the machine by the operator. The mixed concrete is by this means lifted to the feeding hopper of each machine, ready for use.

Making the Block

Blocks are made on two Universal machines, a heavy duty blockmaker and an automatic stripper. These machines are shown in Figure 5. A third machine, another heavy duty blockmaker, has been purchased and will be installed within a short time. The heavy duty machine is used for making face block, and is equipped with solid end doors. Corner block and other specials are made on a hand machine, as it is deemed poor policy to tie up a high production machine on work of this sort.

The average daily production of the automatic stripper is 1,600 block, 8x8x16, per 8 hr. day, while the production of the other machine is about 1,200 per day. With the addition of the third machine the production of this plant should be approximately 4,000 units a day.

In the old plant the track and car system was used to transport the block to the curing room and from there to the storage yard. Since there were quite a few of these cars on hand when the new plant was put into operation, they converted them into racks for use in the new plant. The lift truck system of transportation was adopted, so the steel frames were simply removed from the car trucks, four pieces of channel iron were riveted on them for legs, and the result was a number of handy racks for use in connection with the new lift trucks. A special Barrett lift truck, with spring frame and rubber tires, was purchased for moving the green block, while another lift truck with steel wheels was obtained for use in taking the cured block from the kilns to the yard. A level and smooth concrete floor in the plant and kilns makes use of these lift trucks an easy matter, while a system of concrete runways in the yard provides for rapid transportation on the outside regardless of the weather. A main runway encircles three sides of the plant, and numerous laterals reduce the haulage distance and keep the main runway clear.

Curing Chambers

The blocks made in the new plant are steam cured, and a very good system of curing chambers have been erected for the purpose. These are arranged in two units, as shown in the plant. There are eight chambers in all, each 13 ft. wide and 20 ft. long, with a capacity of about 450 block. A central passageway, as shown in Figure 7, runs between the two units, and down this passageway are installed the main steam lines with laterals to each room. The passageway is lighted with electric lights, while the steam pipes are well covered with plenty of asbestos pipe covering.

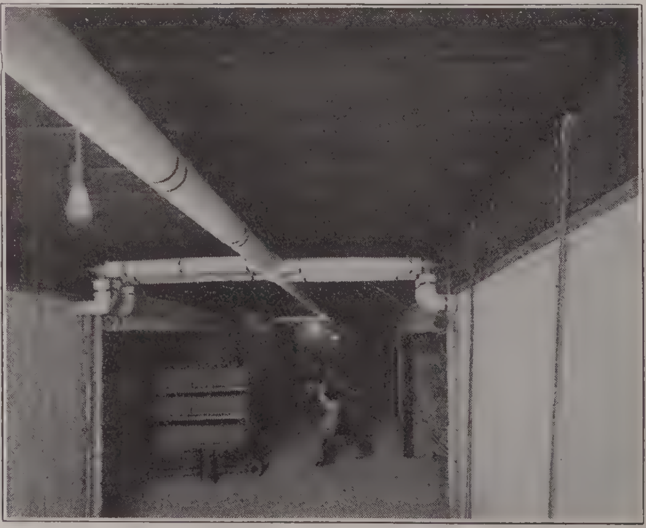


Fig. 7—A view of gallery between steam curing rooms. Note that canvas curtains are used to close door openings

The steam, as it comes from the boiler, is introduced into cast iron radiators along the sides of the curing rooms. In each of the radiators are openings through which live steam is allowed to escape into the curing rooms. In this way the radiators keep the temperature of the curing rooms at 110 to 125 degrees Fahrenheit, and the escaping steam affords a warm moist atmosphere, and thus an ideal curing condition is obtained. Canvas curtains permit easy shutting off of any curing room, or half a room, as fast as it is filled, and no time is lost in curing while waiting for the entire kiln system to be filled up. The detail of this curation is easily seen in the illustration.

The block remain on the rack during the curing process as usual and are not removed therefrom until they are stacked in the yard. Filling and emptying a kiln is quickly and easily done by means of the lift trucks, and handling costs are very low as a result.

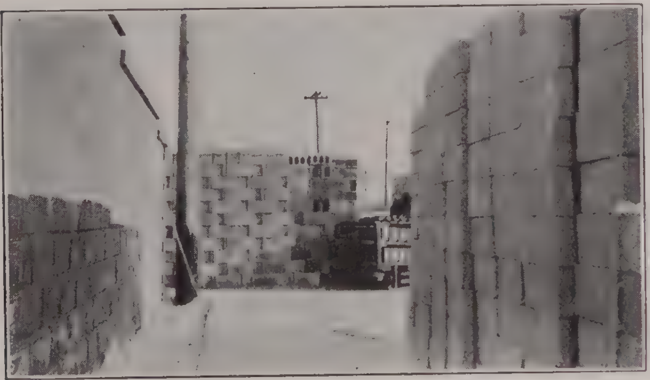


Fig. 8—A view of concrete runway in storage yard

Operating Force

The plant is at present operated with a crew of ten men. A foreman, a mixer man, two machine operators, two off-bearers, two men on the lift trucks, one hand machine operator, and one general utility man are on the payroll. The latter fires the boiler, piles block in the storage yard, and lends a hand generally wherever required. This force is shown in the photograph, and is a crew that works well together as an efficient team. The foreman, Otto Speckman, is fully able to run the entire plant efficiently and contributed a great deal to putting the works into satisfactory operation.

When interviewed, Richard Hammerschmidt, the president of the concern, stated that so far as he has not found it necessary to go out and energetically sell his products. Rather, he intimated, it has been found the high quality of the units themselves have built up a demand that so far has absorbed the entire output. A stock of at least 350,000 block must be piled up in the yard to take care of the demand expected for this spring, and this means operating all winter. As the plant grows, however, some sales campaign may be found necessary in the future.

Fig. 9—The "men behind the block."

The business is being administered by relatives of the founder; the president, Richard Hammerschmidt, being a brother; George, a nephew, is vice-president, and Martin, his son, is treasurer. The products are shipped to most of the western suburbs of Chicago and are used in a great deal of residential work.

Pioneer Manufacturers of Lift Trucks Announce Merger

An interesting development of the new year is the recently announced merger of the Stuebing Truck Co., of Cincinnati, Ohio, and the Cowan Truck Co., of Holyoke, Mass., manufacturers of well-known lift trucks and platforms under their respective names since 1912. The name of the new corporation is the Stuebing-Cowan Co.

Cowan "Transveyors" are said to be the pioneer commercial development of the lift truck system. These original trucks and later developments, combined with the Stuebing types, represent a complete line of equipment covered by numerous patents.

The total unit installations of both companies reach 264,000 in every line of industry in America and throughout the world.

While the directing headquarters of the Stuebing-Cowan Co. will be at Cincinnati, the Cowan truck division will continue its operation at Holyoke, Mass., uninterruptedly.

The merger represents a combination of assets and resources of approximately a million dollars. Sales offices will be maintained in all principal cities, with stocks located at convenient points to provide prompt service.

Kent Machine Company Acquires Falls Clutch

The Kent Machine Company, of Kent, Ohio, announces the recent purchase of the Falls Clutch and Machinery Company, of Cuyahoga Falls, Ohio.

Both firms are well known in their respective fields, and a great deal of interest is manifested in the consolidation.

The business office of the Falls Company will be removed to Kent, but the present intention is to manufacture the established line of transmission machinery at both plants, thereby greatly increasing production facilities and adding materially to the effectiveness of the service.

The officers of the Kent Machine Company are:

M. G. Garrison, president.
J. G. Getz, vice-president.
R. H. Smith, treasurer.

A. B. Babbitt, secretary-general manager, all of Kent, Ohio. The Board of Directors consists of the foregoing officers and J. W. Salter, also of Kent, Ohio, and T. King and D. King, both of Quincy, Mass.

The company announces that a new sales policy is to be inaugurated by which their products are to be sold through mill supply companies and factory representatives in the various trade centers.

Meet to Discuss Simplification of Reinforcing Bars

Two meetings of importance to the steel reinforcing bar industry were held on January 26 by the Department of Commerce, in Washington, D. C. One of these was a revision conference to consider what further changes should be made in the simplification program adopted more than a year ago under which is 44 sizes (cross section areas) were reduced to 11. The second considered whether it was possible to adopt one of the existing standard specifications for new billet steel bars from which reinforcing bars are rolled. Results will be announced later.

How, What, Where, and When?

Would like to have some experience on laying walks in winter on frozen ground. We have laid walks in freezing weather with good success as long as we could keep frost out of ground under walks. We would cover ground with straw and have been able to keep same from freezing until week before Christmas, when the thermometer went to 6° below, have not laid any walks since, but have several thousand feet that should be laid around a new school. Would it be safe to lay on frozen ground? I feel that the frost would thaw up in walk and cause same to freeze.

Would be pleased to get any authority on same.

J.H. S——,
Bremen, Ohio.

In answer to your inquiry, we would advise that we do not consider it safe to lay sidewalks on frozen ground. If the sidewalks, however, must go in at this time, it would be possible to lay them if you would first dig out the soil down to the bottom of the frost and then fill with non-frozen material, well compacted. If you have no good way to thaw out the soil, possibly this would be feasible, in place of the necessary excavation. For this purpose, on the particular job that you mention, we might suggest running out steam lines from the boiler of the school building, and by the use of steam jets thaw out the ground thoroughly before compacting and laying your walk.

The steam can be introduced to the soil by means of a steam point, which is easily made. Simply take a piece of pipe and hammer down one end to a point, then drill a number of holes along the sides of this point, large enough to permit the escape of a small jet of live steam. Put these steam jets on the end of a length of heavy hose and connect the hose with the boiler.

You will find this method very economical where a good supply of live steam is already available.

If you are unable either to excavate the soil or thaw it out as suggested, then by all means wait until nature has done her part in thawing out the ground. We would also advise adequate precautions in mixing and placing the concrete itself. It is well to heat the concrete itself so that no frozen lumps will get into the mixer; heat your gauging water, and then cover the newly laid walks with a heavy layer of straw and canvas.

The same steam jets may be used in heating the materials and in protecting the walk from freezing until the concrete is set. At no time should any of the materials or any part of the work get any colder than 60 degrees Fahrenheit for the first 28 days.

With these precautions, your job should be as good as it would be during the summer time, provided that the concrete is otherwise well proportioned and well mixed, and that too much water is not used.

Do you publish a book entitled Concrete Stone Manufacturing? If so, kindly let me know. I would like to get something on face brick made of cement.

F. S. A——,
Ogilvie, Minn.

. . . our book, "Concrete Stone Manufacture," is now out of print and the supply exhausted. We are, therefore, unable to fill any more orders for it.

We are asking the Portland Cement Association to get in touch with you on the subject, and are also passing along the word to the different manufacturers.

Kindly send us the address of the manufacturers of steam curing sheds for hardening hollow concrete slabs and oblige.

R. M. K——,
Stratford, Conn.

We can only suggest that you either develop a special shed of your own or build one of the ordinary ones, as used by products manufacturers throughout the country.

The usual curing shed appears to be part of the structure and is ordinarily built of concrete blocks or brick, in the case of a plant manufacturing such materials. At any rate, it is usually of good masonry construction with a lining of roofers' felt or other insulating, waterproofing material and equipped with a steam pipe from which live steam is drawn by means of petcocks. This steam line is connected with the main boiler of the plant, and affords the introduction of sufficient steam to cure the products.

Some men are agitating water-curing instead of steam-curing and induce sprays of water into the curing rooms by means of spray nozzles connected with the water line and a compressed air system.

I have a floor 90 yards square that is causing a lot of annoyance through dampness, causing the linoleum to rot, etc. I have thought of waterproofing and would like to know what you suggest.

E. H. T——,
St. John's, Newfoundland.

Dampness between linoleum and a cement floor is mainly caused by condensation. All earth contains moisture, which, in the case of a floor laid directly upon the ground, is drawn by capillary attraction up into the floor.

The presence of moisture in the floor makes the floor surface colder than the air of the room, which causes condensation, i. e., precipitation of the moisture in the air when it comes in contact with the colder floor surface.

The linoleum on top prevents evaporation of this condensed moisture when the air cools, so it remains upon the surface and gradually causes the linoleum to rot.

If the ground underneath, as in time of heavy or continued rain, is very wet, the moisture will be drawn to the surface of the floor and act in the same manner as water from condensation.

The only sure way of preventing condensation is to lay an integrally waterproofied floor, using lime or other commercial admixtures, over the present one, about one inch thick, which will keep the ground moisture that distance away from the surface. This will enable the floor surface to attain about the same temperature as the air, thereby preventing condensation (a very dense concrete will often owner the purpose as well).

Painting the floor (with a special paint) will to some extent reduce the condensation, as it will keep the ground moisture the thickness of the paint film away from the surface.

Would you kindly advise me what you consider the best preparation for filling concrete seams when expansion must be allowed. The job I refer to is a swimming pool.

W. I. E——,
Littleton, N. H.

When it comes to filling the expansion joints on your swimming pool we would suggest that you use any of the plastic asphaltum materials which will remain plastic at the low temperature found in such uses, or any preparation similar to the mastic prepared by . . .

If your local building supply dealer is unable to furnish such material, please let us know and we will see what we can do toward securing the names of manufacturers and quotations through our usual service.

Standardized Forms Helped This Job

Increasing Speed and Lowering Costs in Building, Erecting and Removing Concrete Forms by Means of Standardization — Keeping the Carpenters Within the Job Schedule One Benefit

By NELSON L. PROTHEROE
Construction Superintendent, Denver, Colorado

High Points in the Use of Standardized Concrete Forms

- Building and placing at 3 minutes' time cost per square foot, including beams.
- Removal and cleanup at 1 minute of time cost per square foot.
- Average turnover of floor forms—Ten times.
- Average turnover of column forms—Four times.
- One-third of floor forms were used eighteen times after slight repairs.
- Three and one-half feet of lumber, board measure, required to form one square foot of forms.
- Beam form construction lifted into the lesser cost of floor forms.

The newly completed South High School at Denver, Colo., with its hollow tile floor construction and its hundreds of columns and beams, offered some speculation at first as to the most economical form building method to be pursued. Nearly all the beams were designed as split, or double, beams.

The type of forms decided upon was a pre-built, standardized one that would permit of a continued use of two kinds. First, a plain section for the floor deck; second, a combination section to take care of the beam side, and the floor deck immediately adjoining. The latter worked itself out in a rather simple form construction shown in Figs. 6 and 7.

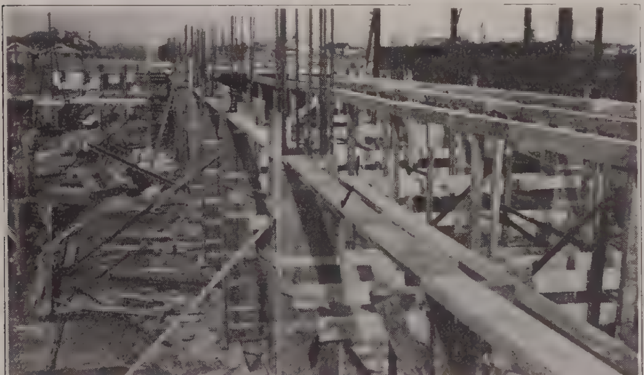


Fig. 1. Caps placed for forms. Post supports are cut to proper height less movement by wedges. After floor forms are placed, elevations are given every 16 ft. in order to level the forms from below

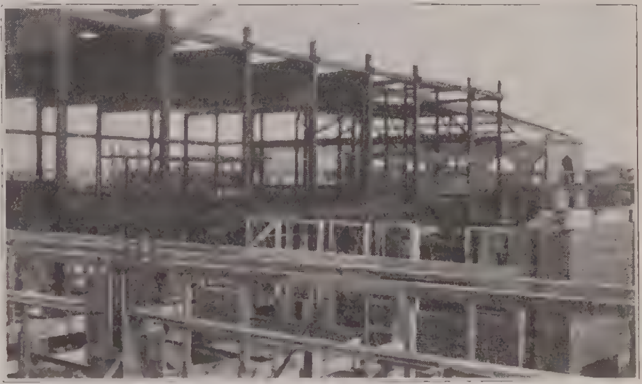


Fig. 2. South High School, Denver, showing standard caps on posts ready to receive standard sized floor forms

All frills in form making were done away with, and theories marched to the rear of practicable, workable thoughts.

The first bit of management was to rig up the yard mill with a combination rip-saw and planer; one swinging cut-off saw; and a band saw.

When all lumber had been delivered to the job it was piled near the mill. Work was at once begun on column forms, which were set to line with their beam soffit boards, cut to length, spanning between. (Figs. 1, 2 and 11.)

Then followed the cutting of the 4x4 post supports to proper lengths. The caps, as shown in Fig. 5, were assembled at the mill. Being put in place, Figs. 1 and 2, they were ready to receive the slab and beam forms as detailed in Figs. 3 to 7, inclusive.

For each succeeding floor to rise, on the rough concrete floor below, 1-in. boards were laid continuously, and at four feet on centers. These were for better movement of wedges.

Setting Forms

The shores, first at sixteen feet on centers, were stood up under the sixteen-foot caps which spanned them. Following this operation by two carpenters and two helpers, another group of carpenters set intermediate supports on loose wedges. This completed the placing of supports four feet on centers each way.

Laborers carried to the carpenters the unit sections of forms which were slid into place. Whenever any bit of projected construction of the building that was not typical was encountered, the necessary fitting of forms was left to a group of carpenters who fell in behind and completed the work.

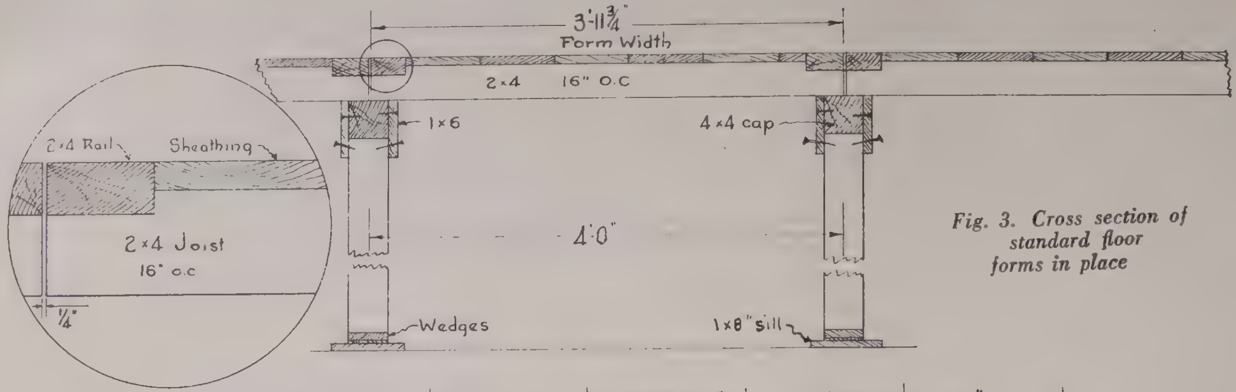


Fig. 3. Cross section of standard floor forms in place

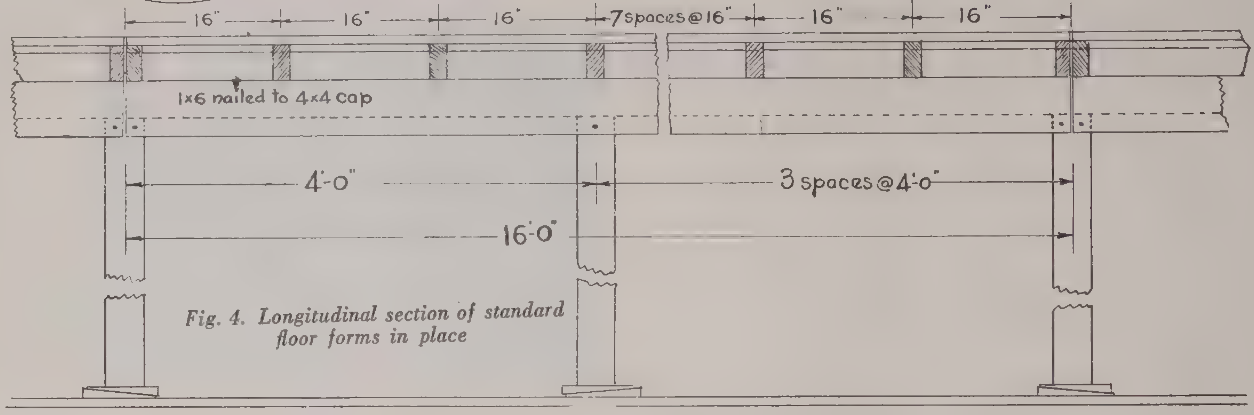


Fig. 4. Longitudinal section of standard floor forms in place

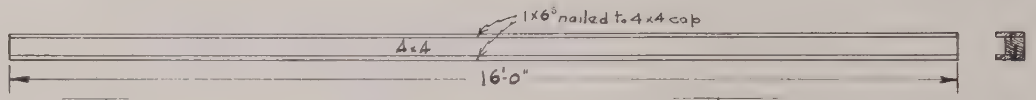


Fig. 5. Detail of standard cap

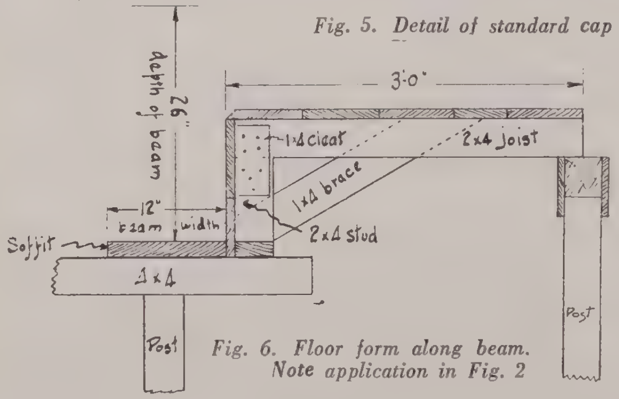


Fig. 6. Floor form along beam. Note application in Fig. 2

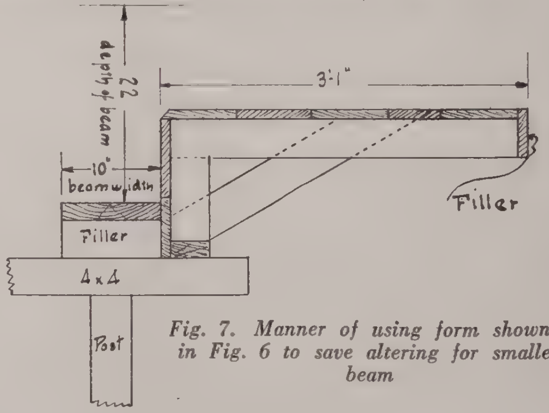


Fig. 7. Manner of using form shown in Fig. 6 to save altering for smaller beam

When all forms were set the leveling instrument was brought into play. Given the ceiling heights every sixteen feet each way, the forms at these points were wedged to the proper elevations by two carpenters working below. Those two men were followed in turn by two others who stretched a line beneath the forms at the points already elevated to final place. With a measuring pole they brought the intermediate shores up by driving the loose wedges and tacking the wedges in place. Result: A level ceiling which later pleased the plasterers.

Side Rails

A word as to the standardized form sections. The purpose of the 2x4 side rails was to give the sections strength. In stripping, they can be dropped from ceiling height without injury. Eight penny nails were used to nail the sheathing to the 2x4 joists, and sixteen penny nails to hold the side rails.

On this job of four thousand yards of concrete, with 180,000 sq. ft. of floor and beam surfaces, 16,000 sq. ft. of column surface, work had to move right along. There were two and one-third millions of brick to place and the form men, concretors and reinforcing men had to keep out of the way.

It is a significant fact that the average force of twenty-four carpenters did the work of building and erecting forms. A most pleasing thing was that within two days usually after a floor section was started the electricians with their conduits, the plumbers and steam fitters with their sleeves and anchors, were already turning over space to the reinforcing men. As the reinforcing steel was picked out and got ready ahead of time the rest of a good concrete job was up to the concretors and the cement finishers to get into line.

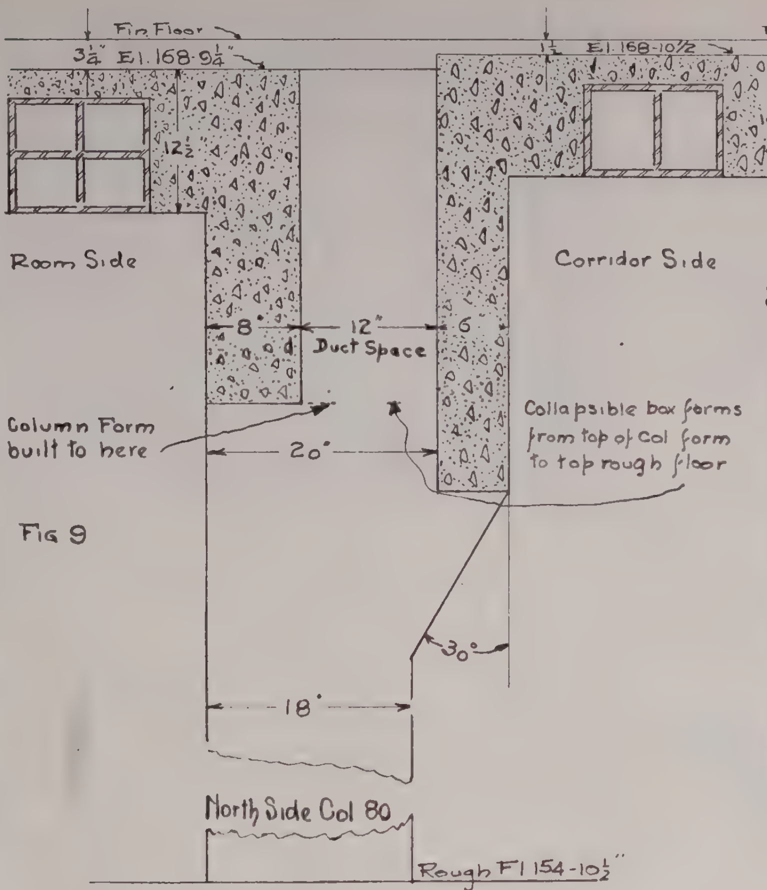

Fin Floor
$3\frac{1}{4}$" El. 168-$9\frac{1}{4}$"
$1\frac{1}{2}$
El. 168-10½
Fin FL
$12\frac{1}{2}$
$10\frac{1}{2}$
Room Side
Corridor Side
8
12"
6
Duct Space
Column Form built to here
Collapsible box forms from top of Col form to top rough floor
20"
Fig 9
30°
18"
North Side Col 80
Rough Fl 154-$10\frac{1}{2}$"

Fig. 9. Column detail, showing what must be taken care of by the standard form

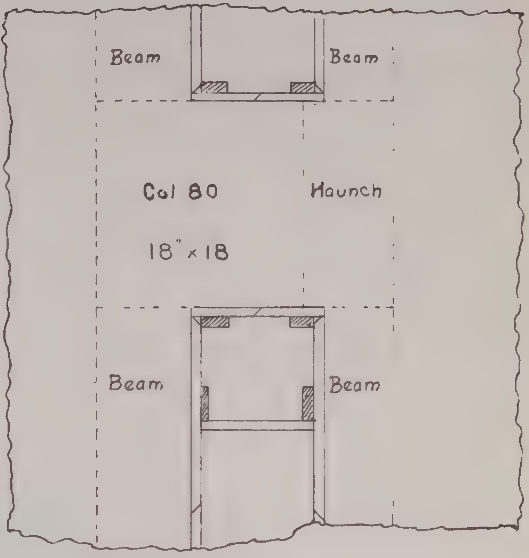


FIG 10 - Plan of Col 80.

Fig. 10. Plan of one column, showing collapsible box forms to form inside of split beams

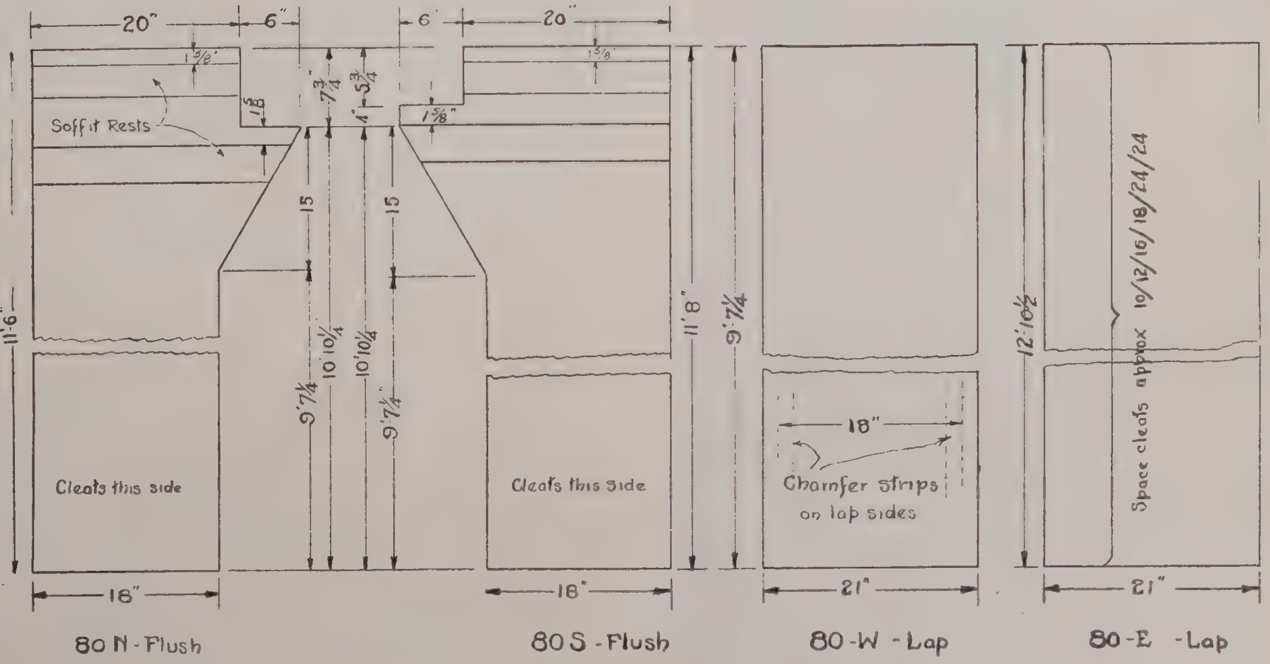


Fig. 8. Information given to yard mill on building column forms for column shown in Fig. 9

Speeds Up the Job

Oftener than not the operation of concreting is the cry and backbone of the whole job. In order to decide just what can be done in that channel, form work must be looked to for arrangements. When form work can be speeded up by the greatest simplicity in design and manufacture there is going to be speed all along the line. Workmen are innately honest. They want to do their bits. When arrangements are properly made for them to act the returns to the contractor are many. The men go after the work, and are satisfied because there is harmony. There are no tie-ups because one craft or another can not get in his work. Good form work makes a good program. The forces of the different crafts on the Denver South High School were kept to surprisingly even numbers of men. And there were no peak loads in employing.

Cleaning Up

As to the cleanup after stripping. There was very little of that required. The use of typical forms and shoring methods took care of that. Stripping was not done except just prior to the erection of another floor section. Without unnecessary handling forms were carried to the point of erection and there slid into place. There was no lumber to clean up and a mighty few nails to draw.

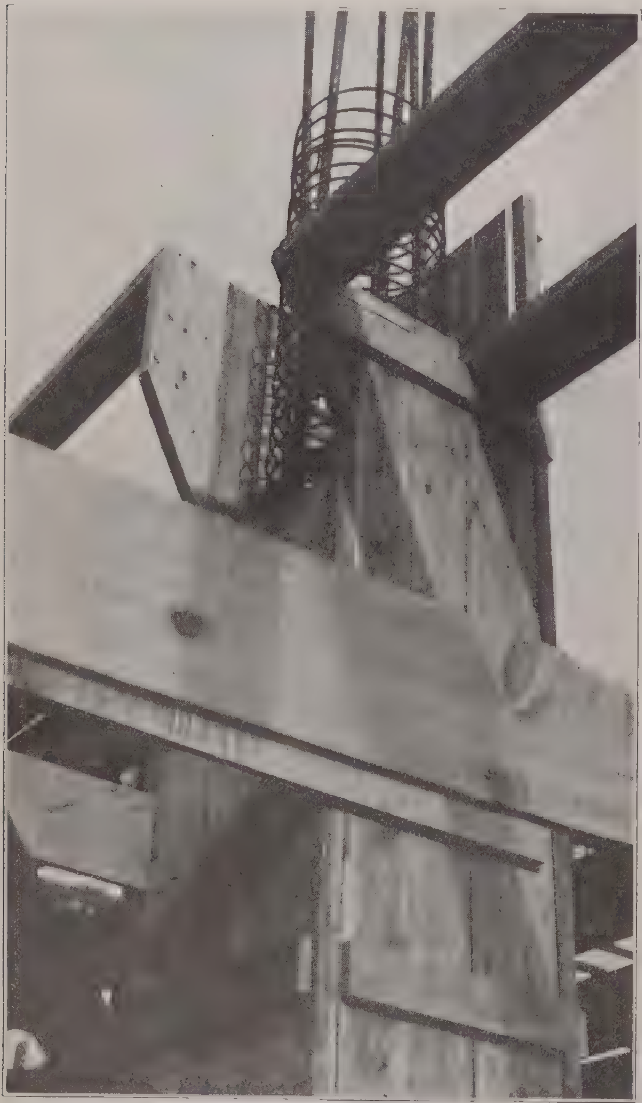


Fig. 11. The column forms have been placed, with soffits resting and ready for the post supports shown in Figs. 6 and 7

Fig. 12. Workmen sawing and fitting material on the job with portable woodworking equipment—cuts operating expenses —(Courtesy Hendrie & Bolthoff Mfg. Co., Denver, Colo.)

The design of the double, or split, beams on this job offered some worry at first. But with the column forms designed as they were there developed almost as much simplicity as would be found in a less complicated building design. Fig. 8 shows how the column forms were built only to the height of the bottom of the highest beam which it was to support. On that point rested the collapsible box forms, Fig. 10, which completed the forming for the column and the beams.

When detailing the column forms elevations were taken of the rough slab at the points where the columns were to rest. The next story height being known, from the difference was subtracted the depth of the shallower beam. That became the form height.

The column schedule dictated the size of the column. The only thing remaining was to show the yard mill how much below the top of the column form the deeper beam extended. The difference in height of the two beams as taken from the beam schedule showed that. There were many different depths of beams, a fact taken care of as shown in Fig. 7, still using the forms already at hand.

Detailing from the framing drawings became an easy task, and was done by the writer during quieter times when the work went on.

The Dunn & Gibson Construction Company, of Denver, Colo., were the contractors on the South High School, and the writer acted as their superintendent. The building was completed exactly on the time as called for in the contract.

Construction Planned for Nassau

It is planned to construct two apartment houses at Nassau, and it seems possible that a number of other apartment houses, suitable for winter visitors will soon be in demand, Consul H. J. Anslinger, Nassau, Bahamas, advises the Department of Commerce. In addition to this, it is likely that a hotel will become a necessity on Hog Island (Nassau's bathing beach) and that there will also be a demand for the construction of a hotel at West End, Nassau. It is suggested that American construction firms who might be interested in this work send their representatives to Nassau, as the time seems opportune for such firms to plan to take advantage of large future developments which appear to be a certainty.

Safety Measures in Construction

Contracting Firm Plays Up Safety Idea—Some Pointers on Safety Measures in General, and the Protection of Material Hoists — A Bell System That Cuts Accidents

(Concluded From January Issue)

The signal system on this hoist consisted of an electric bell located at the hoisting engine, connected with dry cell batteries placed close by, and a pair of well insulated wires extending the full height of the hoisting tower. There were no connections between these wires at any place, but at each landing the insulation was removed at each wire for about two inches. These two exposed spots on the two wires were located about 12 in. apart to lessen the danger of short circuiting and were between three and five feet above the level of each landing. A second bell was then mounted in series with a good push button on a short piece of board, equipped with a suitable carrying handle. One short piece of wire from the bell and another from the push button, both equipped with spring connections at the end completed the equipment.

One man was placed in charge of the hoist as usual, and given the bell and push button mounted on the piece of board. A hole was bored through this board near the top so that it could be hung over a projecting spike at each landing. The signal man then connected the two short wires by means of the spring connections to the main circuit wires where the insulation was removed at the receiving landing and gave his signals to the engineer with the push button. The bell mounted on the board in front of the signal man rang simultaneously with the bell at the hoisting machine, enabling him to detect at once any error in his signal due to a defect in the push button or a poor circuit connection.

Can Be Foolproof

A little study of this scheme will quickly show that it has one decided disadvantage from a safety standpoint. At any landing where the insulation is removed, signals may be given by simply connecting the two circuit wires with any piece of metal. This disadvantage can be entirely eliminated however, as Mr. Johnson points out, by properly housing the batteries in a small cabinet and mounting signal man's bell and button on the top or side of this cabinet. If this method is followed the system becomes absolutely safe from unauthorized signals, but gives the signal man complete control of his car from any floor. The expense of equipping hoists with this system is certainly a minimum for an electrical system. Furthermore, there is very little mechanism to get out of order. Practically the only disadvantage that this method of control possesses is the necessity of the signal man carrying with him the mounted bell and battery whenever he changes his position from one landing to another, and when he leaves his work at noon and night. This disadvantage is slight when the fatal results that occur from improper signals are considered, and may be regarded as a very minor objection.

For an electrically controlled hoist, it seems doubtful if a safer or more simple method of control can be secured than the system above described, provided the batteries are carried by the signal man. On any material hoist where electrical control is considered superior to the cord and gong method this scheme is recommended as the safest and most practical of any yet found.

All equipment such as buzzers or bells, push button, batteries, etc., should be of good quality and kept in perfect condition. A buzzer is more reliable than the electric bell, as it occasionally happens that the springs on the bell fail to function properly.

Due care should also be taken in arranging the signalman's cabinet, the space of the batteries being so made that they fit in position without room to shake loose and are well protected from moisture in wet weather. All wiring for the signal man's cabinet should be enclosed with only the two wires that connect being exposed. It is also well to enclose the bell or buzzer except for a perforated or screened section, as this cabinet is subjected to rather hard usage.

The two main circuit wires running up the shaftway should be well insulated and securely stapled to the hoist framing or guard post and should be at least four (4) inches apart. Care should be taken in locating them so they do not conflict with the operation of the safety bar at the landings, yet are in a convenient position so that the signal man can easily snap on his connecting wires.

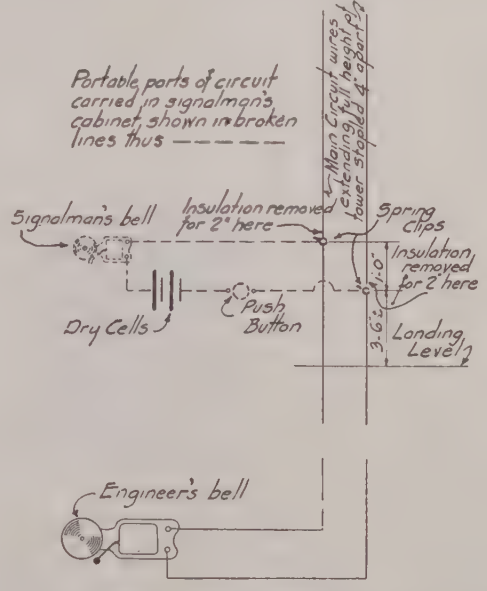

Portable parts of circuit carried in signalman's cabinet, shown in broken lines thus — — — — —
Main Circuit wires extending full height of tower stapled 4" apart
Signalman's bell
Insulation removed for 2" here
Spring Clips
Insulation removed for 2" here
1'-0"
Dry Cells
Push Button
3'-6½"
Landing Level
Engineer's bell

Fig. 2—Diagram showing details of electric bell signal system.

The choice between the electric bell system of hoist control and the cord and gong method must be made according to the location of the hoist and the working conditions at the building by the superintendent in charge. In cases representing the most difficult conditions, it is quite probable that the electric bell control will prove more advantageous as well as the safest. In other more simple installations and perhaps on all towers only a few stories in height, the present system of cord and gong signaling, properly protected, will give safe and practical results.

Guarding the Bell Cord

In order to properly protect the bell cord from use for signals by unauthorized persons, it seems necessary to guard it for the entire length of the tower by boxing it in a tight, strongly made wooden box. This precaution is not general practice on construction work at the present time, but experience seems to indicate that it is an essential feature and must be permanently adopted.

At each landing suitable openings which can be closed and locked must be provided, giving the signal man access to the bell cord. All of the locks on any series of landings should open with a single key, to be carried by the signal man at all times. Horizontal runs of cord at all locations should also be protected by a suitable guard.

For any system of cord and gong signals, only a very good grade of cord should be used, preferably tiller rope. As few pulleys should be used as possible. These should be carefully selected to fit the cord properly and should have guards attached to them so that the cord will not fall away from the groove of the pulleys when it is slack and become wedged between the pulley and its casing. If it is necessary to join two pieces of cord together they should be knotted as neatly as possible and the two loose ends not cut off short but laid along the cord in each direction for a few inches and the whole connection carefully taped to prevent fouling on the sides of the box.

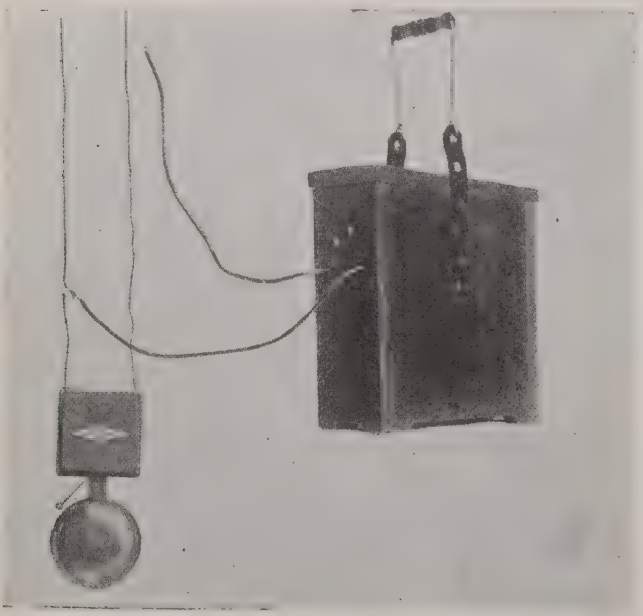


Fig. 3—Electric bell signal system, showing signalman's portable cabinet which contains dry cells, pushbutton and small electric bell, connected in series with engineer's large bell.

Gongs should be kept in good condition and should be replaced at once if not in satisfactory working order.

Where two or more hoists are operating in such positions that signals from either gong can be heard by both engineers, gongs of distinctly different tones should be provided by using gongs with wood and with metal hammers. It should be the duty of the signal man to make regular inspections of the signaling equipment and to make such repairs to it as are found necessary, or, in case extensive repairs are required, to report them to his foreman.

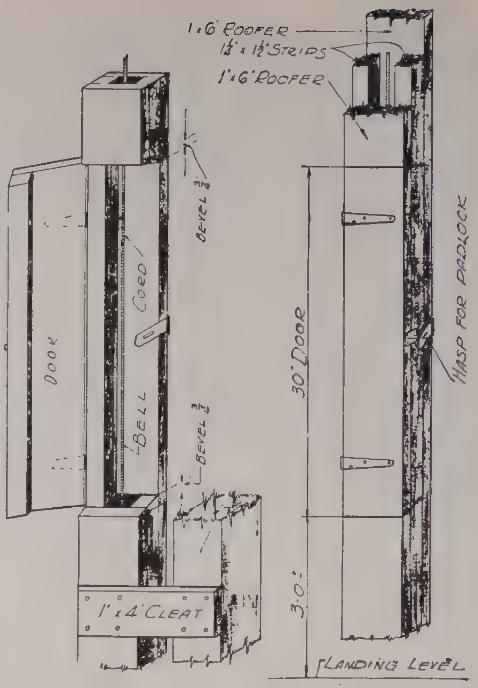


Fig. 4—Detail of bell cord box.

Post Signs

Proper signs against riding or climbing on the hoist must be placed and these regulations strictly enforced. No person is of such importance that he is not subject to the law of gravity, nor is his desire for a speedy trip to the roof worth the setting of a bad example to the workmen.

Wherever the material hoist is used by the subcontractors on a building for hoisting their materials, the regular signal man should remain in charge of the hoist and should be given instructions to be especially careful owing to the fact that slightly unusual conditions exist.

Bar stops for the wheels of the wheelbarrows should be provided so that the wheelbarrows will always be placed correctly on the car platform and not project over the edge.

If the hoisting tower is located on the exterior of the building, adequate railings and toe boards must be placed at each landing when erected and maintained in good condition.

All runways and landings should also be kept free from accumulation of mortar and rubbish which might cause employees to trip.

It should be noted that the so-called 1-2-3 signal system, namely, one to stop, two to raise, and three to lower, does not agree with the New York Industrial Code, but the 1-2-3 system is in universal use in New York and is certainly a safer system than that contained in the code. While the four bell signal to lower slowly should be retained, it should never be used as an excuse for any man, no matter what his position may be, to ride on a material hoist.

Mr. Doe's Conclusions

In concluding it might be well to note that safety in any one feature of construction work, such as hoisting materials on platform hoists can not be realized by special forms of equipment or elaborate mechanical arrangements unless an attitude of carefulness and regard for safe working conditions prevails on the entire building operation.

Carelessness is a very vicious habit and it is in itself largely responsible for most of the accidents which occur on construction work. Unless building organizations are cautioned against careless practices which may lead to accidents, and continually educated along safety-first lines, it is impossible to realize proper advantages from the installation of safety devices. Workmen who are found taking careless chances should be reprimanded, and if they still insist on careless practices, should be discharged.

On all work an attitude of watchfulness for the safety of all should be created and maintained. Accidents arise from strange causes and happen at the most unexpected times. It is better to think ahead of the accident that might happen, and remove the cause, than recall with regret how easily it might have been prevented as the ambulance drives away.

Only continual watching, combined with the expenditure of ably directed efforts toward safety, from first to last, can lessen to a minimum accidents in building work.

Using Color on the Modern Home

(Continued From Page 17)

exposed surfaces, but it appears that the use of, in some cases, unsuitable colors, and in other cases the use of too great a quantity of pigments has resulted in turning this surface film into a soft skin that soon washed off in the rain, and exposed the gray concrete underneath. The usual practice now is to color the entire tile, and then surface it with a rich paste of cement and color that is well trowelled into the tile or otherwise worked into the surface. Here again, the use of better colors has almost eliminated the fading that was formerly observed when some roof tile had been in place for a number of months or years. One manufacturer grinds his color and cement together for over an hour before sending it to the mixer, and believes his product greatly improved thereby.

The roof tile are always to be chosen for style and color to harmonize with the form and color of the building itself, and tile are available to suit any architectural design. The cost is reasonable and the roof everlasting.

In the manufacture of floor tile and ornamental units much the same ideas are called into play, but here a greater wealth of coloring may be provided.

The growing popularity of the concrete floor calls for further advances in the judicious use of colors. Either an allover tone may be used, either integrally or as a surface film, or greater artistry may be demanded. A popular idea in the tropics is to work into the surface of such a floor a design similar to that of an oriental rug placed in the center of the room. Some very lifelike work of this kind has been executed, both by using inlaid tile and by working the design into the monolithic floor itself. This is very applicable to the Spanish and the Moorish houses, or to those in the Mexican motif, since the use of concrete floors without vermine-housing rugs is automatically suggested. Marble or slate effects are easily gained at a reasonable cost.

Summing up, the architect and the builder will not fail to realize that greatly improved appearance is available for the concrete home when judicious use of color is relied upon to become a part of the architectural scheme of the house itself, inside and out. This work may be done economically and with success if the appropriate colors are used, if they are incorporated in the concrete or applied to the concrete in the correct manner, and if the art of the architect and the art of the builder and the art of the craftsman are all united to the end that the best sort of design, workmanship, and material are united to obtain the best sort of result consistent with available funds.

Studies of Bond Between Concrete and Steel

By DUFF A. ABRAMS

Structural Materials Research Laboratory, Chicago

"Studies of Bond Between Concrete and Steel," by Duff A. Abrams has just been published as Bulletin 17 of the Structural Materials Research Laboratory, Lewis Institute, Chicago. The report is reprinted from the 1925 Proceedings of the American Society for Testing Materials.

Bond tests were made by applying a pull on one end of 1-in. plain round steel bars embedded axially in 8 by 8-in. concrete cylinders; parallel compression tests were made on 6 by 12-in. concrete cylinders. The concrete covered a wide range in quantity of mixing water, cement and size and grading of aggregate. Tests were made at ages of 7 days to 1 year. 735 pull-out bond tests and 735 parallel compression tests were made.

The principal conclusions from the tests are:

(1) Slipping of the bar began at a bond stress of about 10 to 15% of the compressive strength of the concrete, but considerable additional load was taken before the ultimate bond resistance was reached.

(2) An end slip of bar of 0.0005 in. occurred at 55 to 60% of the maximum bond. For mixtures leaner than 1-1, the maximum bond was about 24% of the compressive strength of the concrete and came at an end slip of about 0.01 in. regardless of the characteristics of the concrete.

(3) Bond and compressive strength increased with age of the concrete from 7 days to 1 year. For 1-5 concrete of water-ratio 0.88, the bond at 1 year was 134% of the 28-day value and the compressive strength was 148%.

(4) Bond responded to changes in water-ratio of the concrete in much the same way as compressive strength; increase in water-ratio due to use of wetter concrete, less cement, or an excess of fine aggregate, resulted in material reductions in both bond and compressive strength.

(5) For mixtures richer than 1-1 the bond fell off probably due to the greater volume changes during hardening, which is characteristic of such mixtures.

(6) The use of 4% of the 28-day compressive strength of concrete as the working stress in bond for plain bars, as specified by the Joint Committee, is justified; this gives a factor of safety of about 2½ to 3 against first slip.

(7) The use of crude oil to replace mixing water, in general, caused a reduction in both bond and compressive strength of concrete due probably to the lubricating effect of the oil. Replacing cement with hydrated lime also decreased the compressive strength and bond about 1.2% for each 1% of hydrated lime in terms of volume of cement or about 2% for each 1% by weight.

A permit has been granted to a large Canadian Department store for an extension to its premises which will cost $2,500,000, Consul E. L. Harris, Vancouver, advises the Department of Commerce. It is understood that a permit will also be granted for a further $1,000,000 development. Two other department stores will soon apply for permits to improve their premises to the extent of $2,500,000. A banking institution will probably remodel its headquarters at a cost of $1,000,000. A Canadian railway company is contemplating a hotel which will cost $3,500,000.

Production and Insurance Problems Stressed at Ohio Convention

The question of production costs is one that has been before the concrete products industry for some time. Mr. E. W. Dienhart of Cement City, Michigan, struck at the very heart of the problem when he suggested at the recent Convention of the Ohio Concrete Products Association the formation of a group of interested block makers who would pool their resources with those of the manufacturers of their machinery, and employ a competent engineer to make detailed time studies of their various operating processes.

Mr. Dienhart pointed out the total lack of definite standards by which he or any other products manufacturer could gauge the output and expense of any plant. As an instance of the problems to be solved, he told of the wide variations of production in his own plant over which he was able to exercise very little positive control without more accurate standards than are now available. His talk precipitated a serious discussion which resulted in the appointment of a committee headed by Mr. Dienhart to consider the question with a view to action at the next meeting of the Association.

Mr. Dienhart's talk was followed by an address by Norman Stineman of the Portland Cement Association who pointed out some of the ways in which present insurance rulings discriminate against concrete products. He stated that in many types of construction a concrete block building was subject to the same penalties as a frame building, and he showed why this condition was unlikely to be changed without some work on the part of concrete products manufacturers. Mr. Stineman's talk was well received and a general discussion followed it, in the course of which several men told of jobs which they had lost because of insurance rates unfavorable to their products. At Mr. Stineman's suggestion, a committee was appointed to secure more favorable insurance rulings in Ohio.

These talks marked the second day's session of the convention which opened on January 12th at the Waldorf Hotel, Cleveland, Ohio. The first day's session was opened with an address of welcome by the Mayor of Toledo, and a short talk by the president, Mr. S. I. Crew. This was followed by an address on "Association Work" by Karl Aschbacher, and a talk by Warren J. Duffy, author of the Ohio Lien Law.

The evening session was given over to the talks of two Building Commissioners, Mr. Hesser of Toledo, and Mr. Bert Walters of Columbus; and to an open discussion of prospects for 1926.

At the business meeting of the convention the old officers of the Association were re-elected to serve for the coming year, Mr. S. I. Crew of Cincinnati, president; Mr. Frank Owen of Akron, Vice-president, and Mr. George Friel, Secretary and Treasurer. At this session a report was made on the work which the Association had done in the past year to secure favorable recognition of concrete products in the building codes of various Ohio cities, notably in the new code being enacted at Dayton. Plans were made for more work along the same lines as occasion might arise in the future. The date and place of the next convention of the Association was decided on as the second week in January, 1927, at Columbus, Ohio.

The Convention closed with a banquet on the night of the 13th at the Waldorf Hotel, and a trip through the plants of the Sandusky Portland Cement Company and the Willys-Overland Company on the morning and afternoon of the 14th. One hundred fifty-five people attended the banquet, taxing the capacity of the Waldorf dining room to the limit.

J. H. Ellison Elected to Head A. G. C.

By Special Correspondent—January 23, 1926

Four busy days were spent by the Associated General Contractors of America, who assembled in Portland, Oregon, from January 19 to 23, where the builders held their Seventh Annual Meeting. The keynote of the whole convention was to urge contractors to do everything possible to keep the Government out of business. Construction of public projects by Governmental forces, it was insisted, is economically unsound and leads to waste, inefficiency and extravagance.

Numerous resolutions were adopted by the convention, chief among them being one concerning surety bonds, recommending to both public and private owners that, so long as the present methods of bonding contractors whether or not they are qualified and responsible prevails in the surety business, some other forms of guarantee should be used for construction purposes.

The contractors also adopted a resolution stating that they should make contracts with other responsible groups in industry to have the lien laws modified. Safety-first methods in all branches of construction were urged to curtail accidents. The adoption of the "Safety Code" by all contractors was covered in a resolution.

Another important resolution passed was to the effect that all increase in the cost of labor and material in building construction should be resisted. It was the feeling of the delegates that the present condition of the construction industry made increased costs economically unsound, unwarranted, and dangerous, inasmuch as building is slackening off to a slight extent and that higher costs would cause a still further postponement of building activity, to the detriment of everyone concerned.

Every effort was made to urge each person interested in building to advocate and advertise a 12-month building program by encouraging winter work and thereby doing away with seasonal inactivity. Resulting further stability of construction, it was felt would in the end reduce costs and put the entire industry upon a sounder economic basis, making for greater profit.

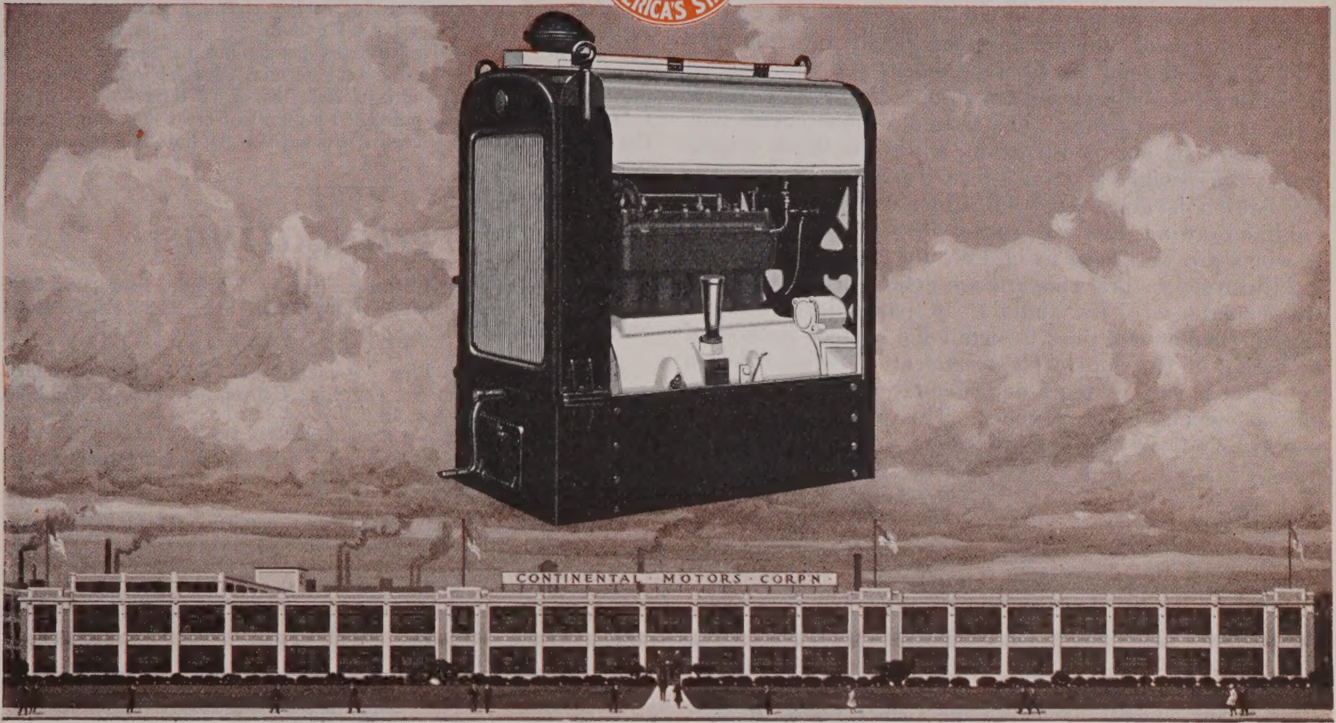
Many specialized committee meetings were held during the convention, in addition to the larger general sessions which were attended by about 500 delegates. An important paper upon the subject of "Specifications for Concrete by Strength Requirements," was read by F. R. McMillan, of the Portland Cement Association. This paper told the contractors in a logical and scientific way the advantages of working by the water-cement ratio, the method that is now coming into wide use.

A number of industrial exhibits attracted attention in connection with the convention. One of these was a display of the new paper cement sacks that are now proving so popular with the contractor.

Before adjournment a new set of officers was elected. J. H. Ellison, of Minneapolis, was elected president. Mr. Ellison is vice-president of the Winston-Dear Co. of that city. Natt McDougall, vice-president of A. Guthrie & Co., Portland, Oregon, was elected vice-president at large. George F. Watson, president of the Watson Company, Dallas, Texas, was elected vice-president of Zone 4. The new board of directors is composed of James E. Cashman, of Burlington, Vt.; Walter H. Gahagan, of Brooklyn, N. Y.; D. B. Fegles, of Minneapolis, Minn.; Robert J. Potts, of Waco, Texas; J. H. Mann, of Oklahoma City, Okla.; H. W. Baum, of Salt Lake City, Utah; and F. J. Twaits, of Los Angeles, Calif.

The new president, in his inaugural address, stressed the fact that the aim of the organization is the betterment of construction conditions, not only for the contractors but for the general public as well.

Dependable Power for Every Purpose



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New Books

"Concrete, Plain and Reinforced," Vol. 1, Fourth Edition, by the late Frederick W. Taylor, Sanford E. Thompson and Edward Smulski, with a chapter by Henry C. Robbins. John Wiley & Sons, Inc., New York City; 969 pages; bound in cloth.

This edition of Volume 1 is completely rewritten and most up-to-date, and affords the student and the designer an unusually comprehensive text on reinforced concrete design and construction. The second volume covers concrete materials and construction, while the third volume deals with special structures of reinforced concrete. The new edition is unusually well illustrated with halftones and line drawings that well convey the desired point. The drawings are well used to indicate the action of stresses, and illustrate the best construction details drawn from the wide experience of the authors. A particularly comprehensive chapter describes in detail the correct method of the design of flat slabs. The treatment of column design includes the various types and adaptation to special uses and various city building codes. This most readable volume well indicates the current advance in putting theory on a firm basis of practice, and in the more practical teaching of theory. A valuable addition to any technical working library.

"Business Organization and Management," by Henry P. Dutton. A. W. Shaw Company, publishers, Chicago; 538 pages, 3¾x6½ inches; bound in leather.

This authoritative and interesting volume, prepared by an experienced business executive and educator, explains in easily understood language the principles of modern business organization and management. Chapters on Business and the Social Structure, Typical Activities of a Business, Scientific Management and Scientific Method, Organization, The Organization of Ownership, Co-operative Enterprises, Opportunity in Business, Testing the Opportunity, Promotion and Initial Operation, Capital, Financial Management, The Mechanism of Accounting, Cost Accounting, Accounting and Executive Control, Credit, Credits and Collections, Banking, Risks and Insurance, Forecasting Business Conditions, Manufacturing, Planning and Production Control, Purchasing and Material Supply, The Office, Marketing Functions, Wholesale Marketing Agencies, Retail Distribution, Selling and Advertising, Labor Management, Wage Payment, Executive Control and Leadership, The Art of Handling Men and a bibliography all make this book an invaluable one for every business man to study. It would be particularly worth while for the growing products plant owner to read, as it will show him how to avoid many pitfalls that cause the early demise of so many organizations.

Trade Publications

A new steel fabric with extra cross sectional area at the edges for use in reinforcing concrete roads and pavements is announced by a circular entitled *"The Durable Road,"* published by the National Steel Fabric Co. of Pittsburgh. Facts and figures on the how and why of fabric reinforcing, together with suggested phrasings for mesh reinforcing specifications, are included.

The U. S. Standard Giant, a heavy duty block machine, marketed by the U. S. Standard Manufacturing Co., Columbiana, Ohio, is described in detail in a recently received circular. Firm security and support of the parts at all times assures a square and uniform block everlastingly. Any thickness pallet, from ¼ to 2 inches, may be employed. A short description is also given of this firm's improved power tamper, of which full particulars are contained in their catalog.

A dense Portland cement, capable of earlier strength and its use under difficult conditions, are advantages claimed for "J.V.D.H." Being unaffected by salt water, its use is especially recommended for piling, tunnels, bridges, sewers, piers, etc. A report of tests on "J.V.D.H." is also contained in a 6x9 4-page folder, procurable from Aug. F. Goris, 103 Park Avenue, New York City.

A chart of mixes, water, mixing time and compressive strengths in *"Universal Dealer"* advocates the use of less water, longer mixing time and more cement, for earlier strength, and uses a comparison of a 1:1½:2½ mix, 4.4 gallons per sack, mixing time of one minute, compressive strength per pound per square inch in three days, 2410 lbs.; and, a 1:2½:4 mix, with 7.7 water, five minutes mixing, and a strength of 2600 lbs. in 28 days.

"Universal Dealer" is published by the Universal Portland Cement Co. of Chicago, Pittsburgh, Minneapolis, Duluth, Cleveland and New York.

Organizations

American Concrete Institute; Harvey Whipple, Secretary, 2970 West Grand Blvd., Detroit. Convention, Feb. 23-26, 1926, Hotel Sherman, Chicago, Ill.

American Concrete Pipe Association; M. W. Loving, Secretary, 111 West Washington St., Chicago. Convention, Feb. 22-23, 1926, Hotel Sherman, Chicago, Ill.

American Construction Council; Dwight L. Hoopingarner, Executive, 28 W. 44th St., New York City.

American Engineering Standards Committee; Dr. P. G. Agnew, Secretary, 29 West Thirty-ninth St., New York City.

American Road Builders' Association; Wm. H. Connell, President, Miss E. A. Birchland, Secretary, 29 W. 39th St., New York City.

Associated General Contractors of America; D. H. Sawyer Secretary, 1038 Munsey Bldg., Washington, D. C.

Associated Metal Lath Manufacturers; 123 West Madison St., Chicago; Wharton Clay, Commissioner.

Building Officials Conference; Frank Burton, President, J. F. Downey, City Hall, Cambridge, Mass., Secretary.

Concrete Reinforcing Steel Institute; M. A. Beeman, Secretary, 160 North La Salle St., Chicago. Annual meeting, March, 1926, Atlantic City, N. J. Date not selected. No exhibits.

Concrete Products Association; S. I. Crew, President, Norwood, Ohio; Frank Owen, Vice-President, Akron, Ohio; Geo. Friel, Secretary-Treasurer, Columbus. Annual Convention, Feb. 25-26, Hotel Sherman, Chicago, Ill.

Mid-West Concrete Products Association; D. R. Donlen, Secretary-Treasurer, 4340 Marcy St., Omaha, Neb.

Ohio Concrete Products Association; G. M. Friel, Secretary-Treasurer, 2284 North High St., Columbus, Ohio.

National Association of Building Trades Employers; A. E. Coleman, President, 37th St. & Stewart Ave., Chicago. A. W. Dickson, Executive Secretary, 214 Electric Bldg., Cleveland, Ohio.

National Association of Builders' Exchanges; William F. Chew, Baltimore, President; Earl F. Stokes, Secretary, 15 East Fayette St., Baltimore, Md.

National Crushed Stone Association; J. R. Boyd, Secretary, 751 Earle Building, Washington, D. C.

National Housing Association; Lawrence Veiller, Secretary and Director, 105 East Twenty-second St., New York City.

National Sand and Gravel Association; T. R. Barrows, 903 Munsey Bldg., Washington, D. C., Secretary.

The National Lime Association; Burton A. Ford, Secretary, 918 G. Street, N. W., Washington, D. C.

Portland Cement Association; William M. Kinney, General Manager, 111 West Washington St., Chicago.

Wisconsin Concrete Products Association; D. R. Collins, Secretary-Treasurer, 425 E. Water St., Milwaukee. Convention, Feb. 4-5, 1926. Milwaukee, Wisc.